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ABSTRACT

Reported are causes of hearing loss for 41,109 hearing impaired students enrolled in 555 special educational programs as part of a national annual survey during the 1970-71 school year. Data is provided on the relationship between hearing loss etiology and the following variables: age and sex of students, additional handicapping conditions, family history of hearing loss, age of discovery, hearing threshold levels, and type of educational program. The data indicated that the cause of hearing loss was due to prenatal factors for almost two thirds of the students, that maternal rubella was the greatest single cause of hearing loss (14 0/0 of all cases and 21 0/0 of cases caused by prenatal factors), that meningitis was the greatest single cause of hearing loss occurring after birth (5 0/0 of all cases and 13 0/0 of cases caused by postnatal factors), and that hereditary factors were the cause of hearing loss for only about 8 0/0 of the students, though an additional 12 0/0 of the students had one or more hearing impaired relatives in their immediate family. (Author/DB)

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ANNUAL SURVEY OF HEARING IMPAIRED CHILDREN AND YOUTH

Office of Demographic Studies
Gallaudet College, Washington, D.C.

RC 006 501

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NUMBER 12

REPORTED CAUSES OF HEARING LOSS FOR HEARING IMPAIRED STUDENTS

UNITED STATES: 1970-71

DATA FROM THE ANNUAL SURVEY OF HEARING IMPAIRED CHILDREN AND YOUTH

OFFICE OF DEMOGRAPHIC STUDIES
GALLAUDET COLLEGE

Washington, D.C.

July 1973

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Ray Trybus, Ph.D., Research Psychologist
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TABLE OF CONTENTS

PAGE

Acknowledgements v
Abstract vi
Introduction 1
Sources of the Data 1
Qualifications and Limitations of the Data 1
Discussion of the Data 2
Detailed Tables

Table 1: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age and Sex: United States, 1970-71 School Year 29

Table 2: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age and Sex: United States, 1970-71 School Year 31

Table 3: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Number of Additional Handicapping Conditions: United States, 1970-71 School Year 33

Table 4: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Number of Additional Handicapping Conditions: United States, 1970-71 School Year 34

Table 5: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Types of Additional Handicapping Conditions: United States, 1970-71 School 35

Table 6: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Types of Additional Handicapping Conditions: United States, 1970-71 School Year 36

Table 7: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired By Family History of Hearing Loss Prior to Age Six: United States, 1970-71 School Year 37

Table 8: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired By Family History of Hearing Loss Prior to Age Six: United States, 1970-71 School Year 38

Table 9: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age of Discovery: United States, 1970-71 School Year 38

Table 10: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age of Discovery: United States, 1970-71 School Year 39

Table 11: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Hearing Threshold Levels: United States, 1970-71 School Year 39

Table 12: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Hearing Threshold Levels: United States, 1970-71 School Year 40

Table 13: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Type of Educational Program: United States, 1970-71 School year 41

Table 14: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Type of Educational Program: United States, 1970-71 School Year 42

Appendices

Appendix I: Description of the Annual Survey of Hearing Impaired Children and Youth 44

Appendix II: Basic Data Form Used in the Annual Survey for the 1970-71 School Year 47

Appendix III: Preschool Data Form Used in the Annual Survey for the 1970-71 School Year 49

Appendix IV: Programs Participating in the Annual Survey of Hearing Impaired Children and Youth 51

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The help and interest of those people contributing data to the Survey Office make this publication possible. We acknowledge the efforts of the personnel at the participating programs whose time and energies are greatly appreciated. The names of these programs appear in Appendix IV. We also thank our National Advisory Committee for their continued support and assistance which have been beneficial to all phases of the Annual Survey of Hearing Impaired Children and Youth.

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Augustine Gentile
J. Bentley Rambin
Peter Ries, Ph.D.
Washington, D.C.
May, 1973

ABSTRACT

The reported causes of hearing loss for 41,109 hearing impaired students are contained in this publication. These data were collected by the Annual Survey of Hearing Impaired Children and Youth from participating special educational programs during the 1970-71 school year.

The relationship between cause of hearing loss and the following variables are presented in this report: age and sex of students, additional handicapping conditions, family history of hearing loss, age of discovery, hearing threshold levels, and type of educational program.

These data indicate that for almost two-thirds of these students the cause of hearing loss was due to pre-natal factors. For the remainder of the students the cause of loss was reported as due to post-natal factors. Maternal rubella was reported as the greatest single cause of hearing loss. It was reported as the cause of loss for about 14 percent of all students, and it accounted for about 21 percent of all the pre-natal causes. Meningitis was the greatest single cause of hearing loss reported as occurring after birth. It was reported as the cause of loss for about five percent of all the students, and it was responsible for about 13 percent of all the post-natal causes. Hereditary factors were reported as the cause of loss for only about eight percent of the students. However, these data show that an additional 12 percent of the students had one or more hearing impaired relatives in their immediate family. The authors estimate that from 30 to 40 percent of hearing impairments can be attributed to genetic causes.

Sources and qualifications of the data are presented in the report. The need for better etiological information, as a basis for more effective programs to prevent deafness, is also discussed.

The Annual Survey of Hearing Impaired Children and Youth is conducted by the Office of Demographic Studies at Gallaudet College. Funding for the program is provided by the National Institute of Education, Department of Health, Education and Welfare and by Gallaudet College.

REPORTED CAUSES OF HEARING LOSS FOR HEARING IMPAIRED STUDENTS UNITED STATES 1970-71

by Augustine Gentile and J. Bentley Rambin

INTRODUCTION

During the past ten years scientists have accumulated a large amount of knowledge about the causes of birth defects, including hearing impairments. This publication contains data on reported causes of hearing loss among 41,109 students enrolled in special educational programs for the hearing impaired in the United States for the 1970-71 school year. It is hoped that this report will add to the existing body of knowledge about the environmental and genetic causes of deafness and will hasten the development of measures to prevent this physical handicap.

These data were collected by the Annual Survey of Hearing Impaired Children and Youth, a continuing program which was started in May, 1968. The program is conducted by the Office of Demographic Studies at Gallaudet College. The major share of funding for the project is provided by the National Institute of Education, Department of Health, Education and Welfare, and the remaining portion is provided by Gallaudet College. A list of earlier publications from the Survey appears on the inside back cover of this report. Further details about the Annual Survey Program may be found in Appendix I.

SOURCES OF THE DATA

During the 1970-71 school year all special educational programs for the hearing impaired known to the Survey office (about 775) were asked to participate in the program. Reports were received from 555 educational programs (72 percent). In terms of enrollment, data were received for 41,109 students, a little more than 85 percent of those estimated to be enrolled in the special educational programs invited to participate. The Survey forms used during the 1970-71 school year are reproduced in Appendices II and III. For the most part, participating schools used data available from existing school records in completing the forms. However, three schools on their own initiative solicited this type of information from parents at the time of the survey.

QUALIFICATIONS AND LIMITATIONS OF THE DATA

As referred to above, the data on causes of hearing loss were derived from information in the school records. In turn, the information in the school records usually was provided by the parents of the student, generally as part of the application for admission to the school. In surveys of the general population, medical or diagnostic information obtained from household respondents is considered reliable enough for most statistical purposes. However, for the particular segment of the population covered in this report the reliability of the information is not known. There are several factors which make it difficult to obtain accurate information about the etiology of hearing loss. In many cases the stated cause of hearing loss was determined retrospectively after the hearing loss was

discovered, and for many cases of hearing defect of early onset the cause is never determined. Further, there is some indication in these data that genetically related causes of deafness are understated.

In spite of the limitations set forth above and more specifically referred to later, these data can provide some insight into the etiological patterns of deafness. It is hoped that the more widespread use of techniques now available for testing newborn infants for exposure to environmental and genetic teratogenic agents will lead to more precise information about the etiology of deafness.

DISCUSSION OF THE DATA

In addition to the general qualifications of the data mentioned above, there are more specific limitations that must be noted in this section. First, attention must be given to the large number of students for whom the cause of hearing loss was not determined or for whom the cause was not available to the reporting school or not reported to the Survey (see Table A). Since there is no basis to assume that the etiology of deafness for these students is similar to the etiology of reported cause of deafness, all percentage distributions here will contain values for these unknown categories.

Another general comment is that for about five percent of the 41,109 students more than one cause of hearing loss was reported. Thus, the tables containing etiological information will show a total of 43,410 causes for the 41,109 students.

Summary of Reported Causes of Hearing Loss

The reported causes of hearing loss are categorized into two groups in this report. One group is entitled "Pre-natal," and the other group is termed "Post-natal Causes." Included in the pre-natal causes are persons whose hearing loss was due to "Trauma During Delivery" and those for whom the onset of hearing loss was reported at birth, but the specific cause was not determined or was not reported. Persons for whom the cause of hearing loss was not determined or for whom the cause was not reported, but for whom the onset of loss was reported as occurring after birth are included in the group showing post-natal causes. A summary of the reported pre-natal causes expressed as a rate per 1,000 students is given in Table B, and the rates for post-natal causes are summarized in Table C (also see Charts 1 and 2). These rates were derived from the data in Detailed Tables 1 and 2.

It may be seen from Tables B and C that pre-natal causes are reported almost 700 times for each 1,000 students and post-natal causes are reported about 365 times for each 1,000 students. Among the pre-natal causes "Maternal Rubella" (147.8 per 1,000 students) has by far the highest rate of occurrence. "Hereditary" (74.8 per 1,000), and "Prematurity" (53.7 per 1,000) have the next highest rates. "Meningitis" (49.1 per 1,000), "Measles" (27.1 per 1,000), and "Otitis Media" (22.5 per 1000) are the three most frequently reported post-natal causes.

TABLE A: SUMMARY OF REPORTED AND UNKNOWN CAUSES OF HEARING LOSS, BY AGE AT ONSET OF LOSS, OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED: UNITED STATES, 1970-71 SCHOOL YEAR.

Responses to Question on Cause of Hearing Loss	Age At Onset Of Hearing Loss					
	All Onsets		Onset At Birth		Onset After Birth	
	Number	Percent	Number	Percent	Number	Percent
Total Students	41,109	100.0	26,703	100.0	14,406	100.0
Specific Cause(s) Reported	21,193	51.6	14,338	53.7	6,855	47.6
Cause Not Determined[1/]	9,784	23.8	7,741	29.0	2,043	14.2
Cause Not Reported[2/]	10,132	24.6	4,624	17.3	5,508	38.2

[1]Students for whom the schools reported that the cause of loss was never determined.

[2]Students for whom the schools reported that this information was not available or the schools left this item blank on the reporting form.

TABLE B: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS PER 1000 STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY CHRONOLOGICAL AGE: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	Chronological Age of Students						
	All Ages	Under 5 Years	5-7 Years	8-10 Years	11-13 Years	14-16 Years	17 Years & Over
Number of Students	41,109	2,527	10,216	7,529	9,509	6,759	4,569
	Number of Pre-natal Causes per 1,000 Students						
All Pre-natal Causes	690.9	785.5	781.2	637.0	670.4	642.7	639.3
Total Specified Causes	390.1	463.0	548.0	318.8	354.5	322.1	289.1
Maternal Rubella	147.8	212.1	361.9	57.9	106.2	28.7	44.6
Trauma To Mother During Pregnancy	6.2	5.9	6.9	6.5	5.0	6.5	5.9
Medication During Pregnancy	6.6	12.7	6.6	7.0	6.9	5.5	3.5
Prematurity	53.7	52.2	45.4	54.7	58.1	66.4	43.3
Rh Incompatibility	34.1	34.4	22.6	35.1	34.3	44.1	42.9
Heredity	74.8	79.1	53.5	81.8	74.6	92.6	82.1
Other Complications Of Pregnancy	24.2	33.2	21.0	25.8	25.2	26.5	17.9
Trauma During Delivery	22.3	17.0	15.1	25.9	22.9	28.7	24.5
All Other Specified Pre-natal Causes	20.5	16.2	15.0	24.0	21.2	23.1	24.3
Onset of Loss At Birth But Cause Not Determined	188.3	230.3	149.7	196.7	189.5	193.4	227.6
Onset of Loss At Birth But Cause Not Reported	112.5	92.2	83.6	121.5	126.4	127.2	122.6

TABLE C: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS PER 1,000 STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY CHRONOLOGICAL AGE: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	Chronological Age of Students						
	All Ages	Under 5 Years	5-7 Years	8-10 Years	11-13 Years	14-16 Years	17 Years & Over
Number of Students	41,109	2,527	10,216	7,529	9,509	6,759	4,569
	Number of Post-natal Causes per 1,000 Students						
All Post-natal Causes	365.1	273.8	274.2	419.6	383.5	420.6	408.4
Total Specified Causes	161.4	156.3	122.3	206.8	185.8	222.1	216.2
Meningitis	49.1	72.4	40.8	59.1	44.1	45.6	53.6
Mumps	8.5	3.6	4.4	11.2	8.9	12.6	9.4
Measles	27.1	5.5	12.7	32.1	31.1	36.1	41.1
Otitis Media	22.5	21.0	15.7	30.2	23.5	27.2	17.5
Fever	15.3	21.4	13.1	15.7	14.5	18.2	13.4
Trauma	10.2	5.5	6.2	9.8	11.1	15.5	12.7
All Other Specified Post-natal Causes	48.7	26.9	29.4	48.7	52.6	66.9	68.5
Onset of Loss After Birth But Cause Not Determined	49.7	37.6	36.9	56.4	53.2	55.9	57.3
Onset of Loss After Birth But Cause Not Reported	134.0	79.9	115.0	156.3	144.5	142.6	134.8

An examination of the rates in Tables B and C can also indicate some trends in the causes of hearing impairment. The fluctuation in rates is greatest for "Maternal Rubella." The high rate (106.2 per 1,000) for students from 11-13 years of age reflects the 1958-59 rubella epidemic. The highest rate for "Rubella" (361.9 per 1,000) occurs among students five to seven years of age and is the result of the 1964-65 rubella epidemic. The rate for "Rubella" (212.1 per 1,000) for those under five years of age is accounted for mostly by children born in 1966 and also indicates the effects of the 1964-65 epidemic. Except for "Medication During Pregnancy," which appears to have increased during recent years and "Trauma During Delivery," which appears to have decreased, it is not possible to detect any major shifts in the other pre-natal causes of deafness.

Post-natal causes of hearing impairment generally appear to have decreased in relation to pre-natal causes for these students. This general decrease is apparent in the rates for "Mumps," "Measles," "Trauma," "All Other Specified Causes," and

CHART 1: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS PER 1,000 STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED: UNITED STATES, 1970-71 SCHOOL YEAR.

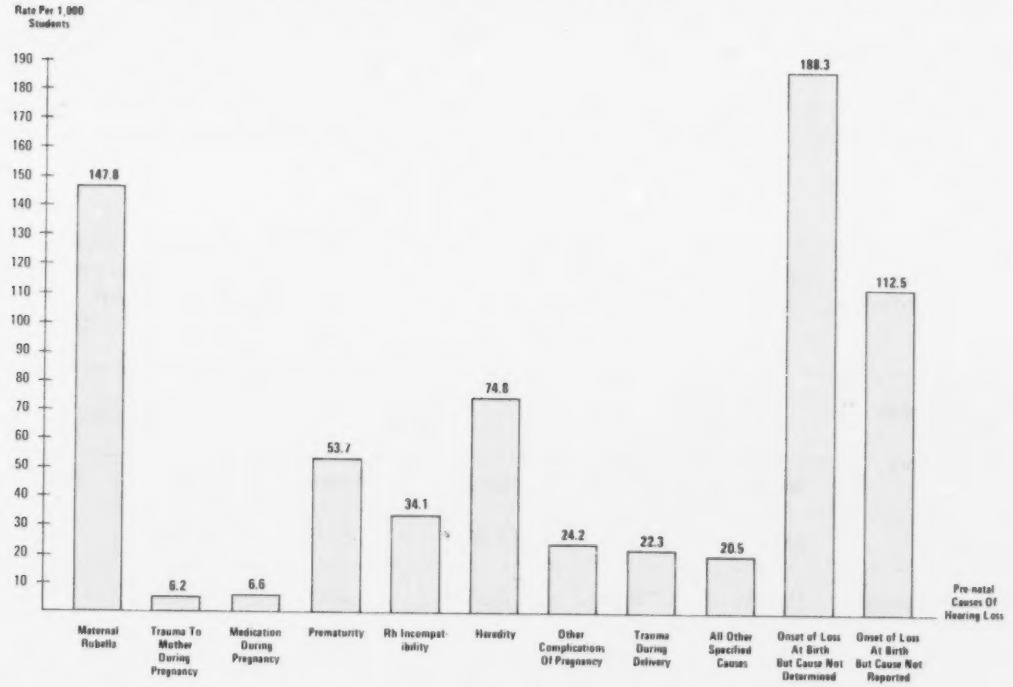
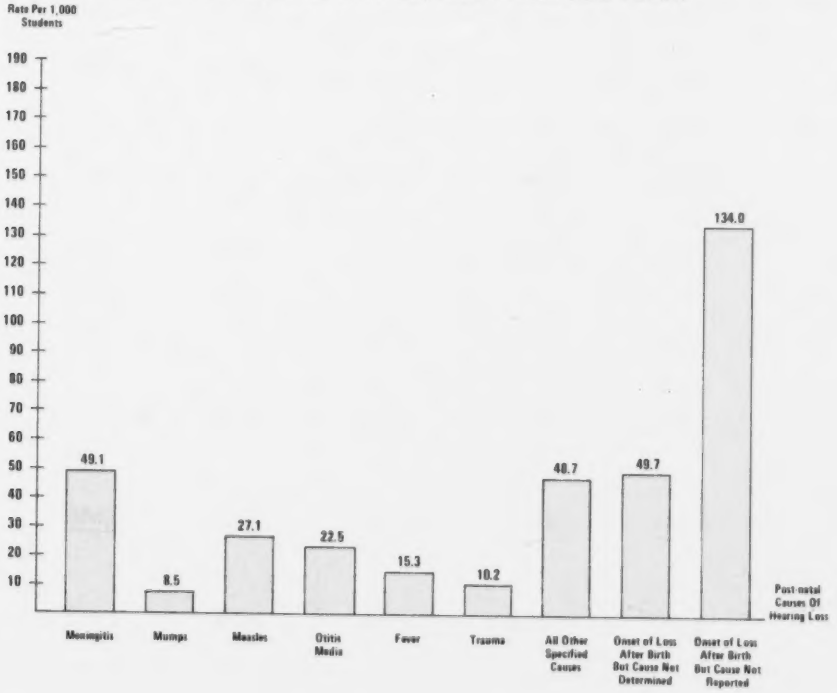


CHART 2: TOTAL NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS PER 1,000 STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED: UNITED STATES, 1970-71 SCHOOL YEAR.



"Causes Not Determined" and "Not Reported." However, in terms of the number of cases and also the rates, it appears that "Meningitis" may be increasing as a post-natal cause of hearing impairment.

Causes of Hearing Loss by Sex of Students

Percentage distributions for causes of hearing loss by sex of the students are shown in Table D and Chart 3 (Pre-natal Causes) and Table E and Chart 4 (Post-natal Causes). These percentages were also derived from the data on Detailed Tables 1 and 2. About 54 percent of the pre-natal causes were reported for males and 46 percent for females. This is approximately the same as the ratio of male to female students who were enrolled in participating programs. Relative to their proportion of enrollment, "Maternal Rubella" and "Trauma to Mother During Pregnancy"

TABLE D: NUMBER AND PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	Both Sexes		Males		Females	
	Number	Percent	Number	Percent	Number	Percent
Total All Causes	28,402	100.0	15,204	53.5	13,198	46.5
Total Specified Causes	16,037	100.0	8,517	53.1	7,520	46.9
Maternal Rubella	6,077	100.0	3,016	49.6	3,061	50.4
Trauma To Mother During Pregnancy	253	100.0	124	49.0	129	51.0
Medication During Pregnancy	271	100.0	151	55.7	120	44.3
Prematurity	2,207	100.0	1,211	54.9	996	45.1
Rh Incompatibility	1,402	100.0	862	61.5	540	38.5
Heredity	3,073	100.0	1,616	52.6	1,457	47.4
Other Complications of Pregnancy	994	100.0	542	54.5	452	45.5
Trauma During Delivery	916	100.0	532	58.1	384	41.9
All Other Specified Causes	844	100.0	463	54.9	381	45.1
Onset of Loss At Birth But Cause Not Determined	7,741	100.0	4,173	53.9	3,568	46.1
Onset of Loss At Birth But Cause Not Reported	4,624	100.0	2,514	54.4	2,110	45.6

CHART 3: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

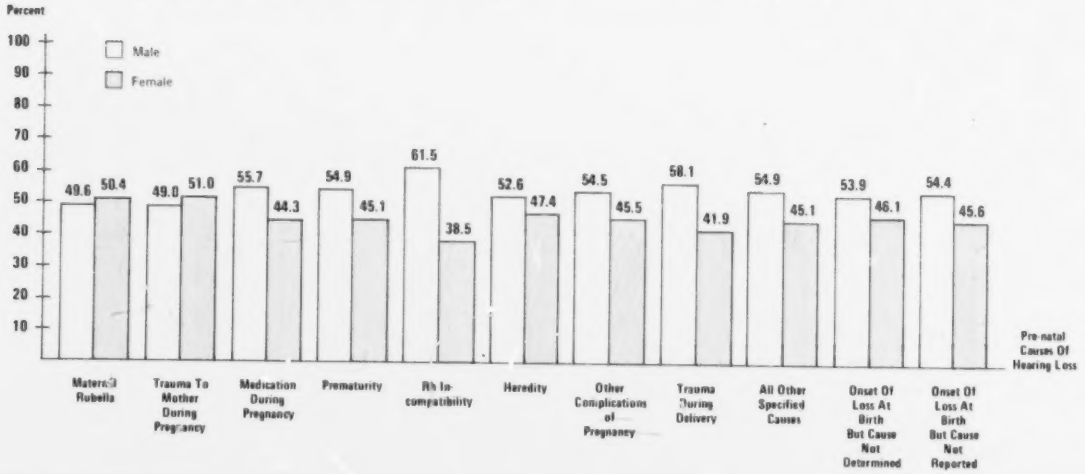


TABLE E: NUMBER AND PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	Both Sexes		Males		Females	
	Number	Percent	Number	Percent	Number	Percent
Total All Causes	15,008	100.0	8,278	55.2	6,730	44.8
Total Specified Causes	7,457	100.0	4,240	56.9	3,217	43.1
Meningitis	2,017	100.0	1,290	64.0	727	36.0
Mumps	351	100.0	187	53.3	164	46.7
Measles	1,114	100.0	542	48.7	572	51.3
Otitis Media	927	100.0	526	56.7	401	43.3
Fever	628	100.0	355	56.5	273	43.5
Trauma	420	100.0	250	59.5	170	40.5
All Other Specified Post-natal Causes	2,000	100.0	1,090	54.5	910	45.5
Onset of Loss After Birth But Cause Not Determined	2,043	100.0	1,091	53.4	952	46.6
Onset of Loss After Birth But Cause Not Reported	5,508	100.0	2,947	53.5	2,561	46.5

CHART 4: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

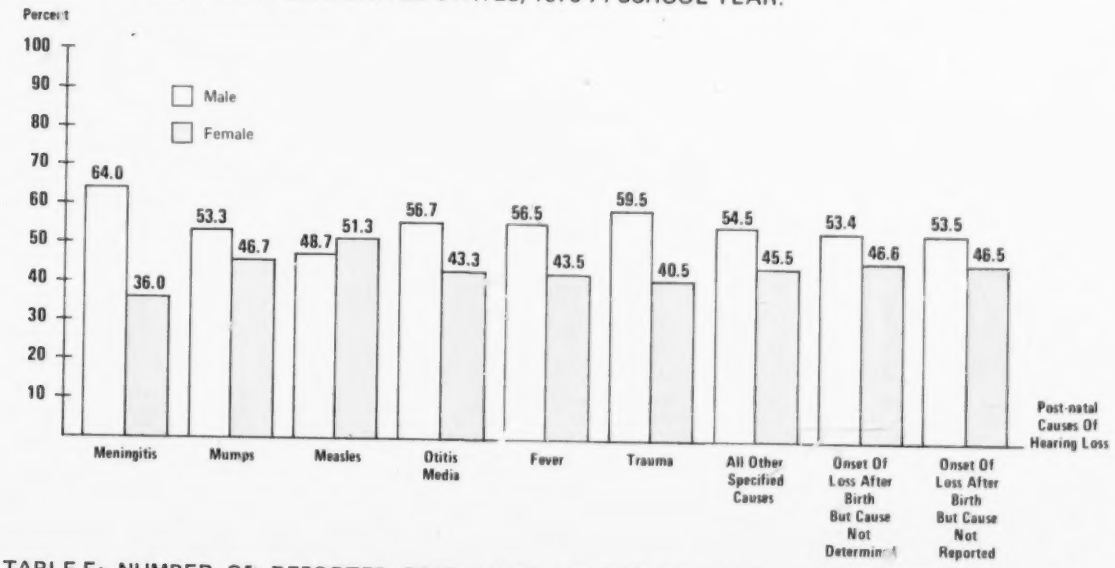


TABLE F: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AT ONSET: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	AGE AT ONSET OF HEARING LOSS				
	All Ages	Under 1 Year	1 Year, Under 3 Years	3 Years & Over	Unknown
Total All Causes	15,008	2,087	3,400	2,539	6,982
Total Specified Causes	7,457	1,821	2,637	1,750	1,249
Meningitis	2,017	692	810	352	163
Mumps	351	26	84	142	99
Measles	1,114	210	403	273	228
Otitis Media	927	95	191	362	279
Fever	628	160	235	109	124
Trauma	420	68	160	137	55
All Other Specified Post-natal Causes	2,000	570	754	375	301
Onset of Loss After Birth But Cause Not Determined	2,043	130	459	375	1,079
Onset of Loss After Birth But Cause Not Reported	5,508	136	304	414	4,654

TABLE G: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AT ONSET: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	AGE AT ONSET OF HEARING LOSS				
	All Ages	Under 1 Year	1 Year, Under 3 Years	3 Years & Over	Unknown
Total All Causes	100.0	13.9	22.7	16.9	46.5
Total Specified Causes	100.0	24.4	35.4	23.5	16.7
Meningitis	100.0	34.3	40.2	17.5	8.1
Mumps	100.0	7.4	23.9	40.5	28.2
Measles	100.0	18.9	36.2	24.5	20.5
Otitis Media	100.0	10.2	20.6	39.1	30.1
Fever	100.0	25.5	37.4	17.4	19.7
Trauma	100.0	16.2	38.1	32.6	13.1
All Other Specified Post-natal Causes	100.0	28.5	37.7	18.8	15.0
Onset of Loss After Birth But Cause Not Determined	100.0	6.4	22.5	18.4	52.8
Onset of Loss After Birth But Cause Not Reported	100.0	2.5	5.5	7.5	84.5

are reported as pre-natal causes more frequently among females, whereas "Rh Incompatibility" and "Trauma During Delivery" are reported relatively more frequently for males. All the other pre-natal causes seem to be reported in the same proportion as the sex distribution of the students.

Among the post-natal causes, "Meningitis" and "Trauma" are reported relatively more frequently for males while "Measles" was reported more frequently for the female students. For the other specific post-natal causes and for all post-natal causes the percentage distributions are proportional to the number of male and female students enrolled in participating programs during the 1970-71 school year.

Post-natal Causes of Hearing Loss by Age at Onset

The age at onset of hearing loss for students whose loss occurred after birth by causes of loss is shown in Table F. A percentage distribution is shown in Table G. It may be seen that almost 75 percent of the "Meningitis" cases occur prior to age three; also about 63 percent of the "Fever" cases, 55 percent of "Measles" cases, and 54 percent of the "Trauma" cases occur prior to age three. On the other hand, only about 31 percent of the "Mumps" and "Otitis Media" cases occur prior to age three.

Causes by Number of Additional Handicapping Conditions

Detailed Tables 3 and 4 show the reported cause of hearing loss according to the number of additional handicapping conditions that were reported for the students. Tables H and I summarize in the form of percentage distributions causes of hearing loss according to the reported number of additional handicapping conditions. No additional handicapping conditions were reported for 58.1 percent of the students; one additional condition was reported 20.8 percent of the

TABLE H: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS					
	Total Additional Handicapping Conditions	No Additional Handicapping Conditions	One Additional Handicapping Condition	Two Additional Handicapping Conditions	Three or More Additional Handicapping Conditions	Not Reported
Total All Students	100.0	58.1	20.8	4.7	1.1	15.4
Total All Pre-natal Causes	100.0	59.8	23.0	5.8	1.3	10.0
Total Specified Causes	100.0	55.4	25.6	7.2	1.7	10.1
Maternal Rubella	100.0	55.1	25.1	7.7	1.8	10.3
Trauma To Mother During Pregnancy	100.0	49.8	26.9	6.7	2.4	14.2
Medication During Pregnancy	100.0	51.7	25.5	9.2	3.0	10.7
Prematurity	100.0	46.2	32.4	10.0	2.4	9.1
Rh Incompatibility	100.0	45.1	34.0	8.0	1.9	11.1
Heredity	100.0	74.3	14.5	2.1	0.4	8.7
Other Complications of Pregnancy	100.0	47.9	29.0	9.7	2.3	11.2
Trauma During Delivery	100.0	43.8	30.9	10.5	2.7	12.1
All Other Specified Causes	100.0	54.9	27.7	6.5	0.9	10.0
Onset of Loss At Birth But Cause Not Determined	100.0	69.1	18.5	3.4	0.7	8.2
Onset of Loss At Birth But Cause Not Reported	100.0	59.6	21.5	4.9	1.1	12.9

time, and two or more additional conditions were reported 5.8 percent of the time.

It may be seen from Table H that when the hearing loss is the result of "Heredity," the students tend to have fewer additional handicapping conditions. For example, while about 27 percent of all students have one or more additional handicapping conditions, the range for each of the pre-natal causes is from about 35 to 45 percent, exclusive of "Hereditary" hearing defects. For the "Hereditary" cases an additional handicap was reported for only 17 percent of the students. As mentioned earlier, there is some evidence,

to be discussed later, that "Hereditary" cases are underreported. It is interesting to note here, that in terms of additional handicapping conditions, the "Cause Not Determined" group is distributed more like the "Hereditary" group than any other condition (see Table H).

Studies have been conducted that attempt to compare the behavior of deaf students of deaf parents to the behavior of deaf students with normal hearing parents. On the basis of the foregoing, it is apparent that studies of this type should take into account the presence or absence of additional handicapping conditions when these might potentially influence the behavior under study.

Again, referring to the data in Table H, it appears that "Prematurity" (44.8 percent), "Trauma During Delivery" (44.1 percent), and "Rh Incompatibility" (43.9 percent) are associated most frequently with additional handicapping conditions. "Rubella," which is the most frequent cause of hearing loss, is associated with an additional handicapping condition 34.5 percent of the time.

The percentage distribution of post-natal causes of hearing loss according to the number of additional handicapping conditions is shown in Table I. These data indicate that when hearing loss is due to a post-natal cause, additional handicapping conditions are less likely to occur than when the loss is caused by a pre-natal condition, exclusive of hearing loss linked to "Heredity." The pattern among the specific post-natal causes is generally similar, except that "Otitis Media" and "Trauma" seem to be associated with

TABLE I: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS					
	Total Additional Handicapping Conditions	No Additional Handicapping Conditions	One Additional Handicapping Condition	Two Additional Handicapping Conditions	Three or More Additional Handicapping Conditions	Not Reported
Total All Students	100.0	58.1	20.8	4.7	1.1	15.4
Total All Post-natal Causes	100.0	53.0	17.8	3.5	0.7	25.1
Total Specified Causes	100.0	63.3	20.8	4.5	0.8	10.6
Meningitis	100.0	63.8	20.7	3.8	1.0	10.7
Mumps	100.0	60.4	21.4	5.1	1.4	11.7
Measles	100.0	64.0	19.3	4.8	0.5	11.3
Otitis Media	100.0	60.4	23.3	5.8	0.8	9.7
Fever	100.0	60.0	17.7	3.8	0.5	18.0
Trauma	100.0	59.8	22.1	5.2	1.2	11.7
All Other Specified Post-natal Causes	100.0	66.0	21.1	4.3	0.8	7.8
Onset of Loss After Birth But Cause Not Determined	100.0	66.3	19.5	2.9	0.7	10.6
Onset of Loss After Birth But Cause Not Reported	100.0	34.0	13.1	2.4	0.5	50.0

TABLE J: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY TYPES OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	ADDITIONAL HANDICAPPING CONDITIONS														
	Total All Additional Handicapping Conditions	None	Brain Damage	Cerebral Palsy	Cleft Lip & /or Palate	Emotional or Behavioral Problems	Epilepsy	Heart Disorder	Learning Disabilities	Mental Retardation	Orthopedic Disorders	Perceptual Motor Disorders	Severe Visual	Other	Not Reported
Total All Causes	100.0	59.8	0.7	3.9	0.5	8.8	0.5	2.5	2.5	6.3	0.7	5.4	5.1	1.7	10.0
Total Specified Causes	100.0	55.4	0.8	5.2	0.5	9.5	0.6	3.6	2.5	6.6	0.7	6.3	6.6	2.0	10.1
Maternal Rubella	100.0	55.1	0.5	2.5	0.3	9.8	0.5	7.3	1.9	4.7	0.7	5.6	10.4	1.5	10.3
Trauma To Mother During Pregnancy	100.0	49.8	0.4	4.7	0.4	11.5	0.8	2.4	3.6	10.7	1.2	4.7	4.0	2.4	14.2
Medication During Pregnancy	100.0	51.6	1.5	3.3	0.4	11.4	1.1	2.6	4.1	8.5	0.7	10.0	4.1	4.1	10.7
Prematurity	100.0	46.2	1.1	8.2	0.6	11.5	0.7	2.1	3.6	11.7	0.8	9.1	8.0	2.1	9.1
Rh Incompatibility	100.0	45.1	1.2	19.8	0.5	7.8	0.6	1.0	3.1	6.6	0.4	8.7	4.1	1.9	11.1
Heredity	100.0	74.3	0.4	0.4	0.3	6.8	0.3	0.6	1.7	3.4	0.8	2.9	1.6	1.4	8.6
Other Complications of Pregnancy	100.0	47.9	1.7	6.0	0.8	11.1	0.9	1.8	3.7	11.1	1.0	9.3	5.8	2.7	11.2
Trauma During Delivery	100.0	43.8	2.4	8.6	0.4	13.5	1.5	1.2	4.6	12.6	0.4	9.4	4.3	1.9	12.1
All Other Specified Causes	100.0	54.9	0.5	6.3	2.1	7.8	1.1	1.1	2.5	5.9	1.3	5.2	4.5	5.5	10.0
Onset of Loss At Birth But Cause Not Determined	100.0	69.1	0.4	1.6	0.5	7.6	0.5	1.1	2.2	5.2	0.6	4.3	2.6	1.2	8.2
Onset of Loss At Birth But Cause Not Reported	100.0	59.6	0.6	3.1	0.8	8.4	0.4	1.1	2.8	6.9	0.8	4.3	3.8	1.7	12.9

TABLE K: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY TYPES OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	ADDITIONAL HANDICAPPING CONDITIONS														
	Total All Additional Handicapping Conditions	None	Brain Damage	Cerebral Palsy	Cleft Lip & / or Palate	Emotional or Behavioral Problems	Epilepsy	Heart Disorders	Learning Disabilities	Mental Retardation	Orthopedic Disorders	Perceptual Motor Disorders	Severe Visual	Other	Not Reported
Total All Causes	100.0	53.0	0.6	1.2	0.5	7.2	0.6	0.7	1.9	6.3	0.5	3.6	2.5	1.4	25.1
Total Specified Causes	100.0	63.3	0.9	1.2	0.7	8.7	0.7	0.8	2.1	7.2	0.5	4.9	3.1	1.8	10.6
Meningitis	100.0	63.8	0.8	1.1	0.1	8.3	1.4	0.4	2.0	6.7	0.4	5.5	2.8	1.9	10.7
Mumps	100.0	60.4	0.9	1.4	1.7	6.6	0.9	1.7	2.6	8.5	1.1	3.4	6.3	1.4	11.7
Measles	100.0	64.0	0.7	1.3	0.6	7.9	0.4	0.9	3.2	7.9	0.4	3.2	3.5	0.9	11.3
Otitis Media	100.0	60.4	1.1	0.8	2.2	10.0	0.4	0.8	1.3	10.5	0.5	5.1	3.2	1.8	9.7
Fever	100.0	60.0	0.3	1.3	0.0	6.7	0.3	1.3	1.0	6.1	0.0	4.0	4.0	2.2	18.0
Trauma	100.0	59.8	1.4	1.9	0.0	10.7	1.0	0.2	2.4	7.4	0.5	6.4	1.7	2.4	11.7
All Other Specified Causes	100.0	68.0	0.9	1.4	0.7	9.4	0.4	0.8	2.1	5.8	0.8	5.3	2.8	1.9	7.8
Onset of Loss After Birth But Cause Not Determined	100.0	66.3	0.6	1.3	0.2	7.5	0.5	0.5	2.3	6.9	0.8	2.9	2.2	1.6	10.6
Onset of Loss After Birth But Cause Not Reported	100.0	34.0	0.3	1.1	0.4	5.0	0.5	0.6	1.5	4.8	0.3	2.0	1.9	0.9	50.0

additional handicapping conditions a little more frequently than the other causes.

Causes by Types of Additional Handicapping Conditions

Tables 5 and 6 give the frequency of occurrence of particular types of additional handicapping conditions in relation to reported causes of hearing loss. Tables J and K give the percentage of times that these types of additional handicapping conditions are associated with a particular cause. The following relationships regarding pre-natal and post-natal causes and their significant associated additional handicapping conditions are worth noting, either because the types of handicaps constitute a large proportion for a particular cause or because the distribution associated with a given cause is different from the distribution of types of handicapping conditions for all causes:

Pre-natal:

Maternal Rubella
: Visual Defects, Heart Disease, Emotional or Behavioral Problems

Trauma to Mother During Pregnancy
: Emotional or Behavioral Problems, Mental Retardation, Cerebral Palsy

Medication During Pregnancy
: Emotional or Behavioral Problems, Perceptual Motor Disorders, Mental Retardation

Prematurity
: Cerebral Palsy, Emotional or Behavioral Problems, Learning Disabilities, Mental Retardation, Perceptual Motor Disorders, Visual Defects

Rh Incompatibility
: Cerebral Palsy, Perceptual Motor Disorders, Brain Damage

Heredity
: Emotional or Behavioral Problems

Trauma During Delivery
: Brain Damage, Cerebral Palsy, Emotional or Behavioral Problems, Mental Retardation, Perceptual Motor Disorders

Post-natal:

Meningitis
: Emotional or Behavioral Disorders, Epilepsy, Mental Retardation, Perceptual Motor Disorders

Mumps
: Cleft Lip and/or Palate, Heart Disease, Learning Disabilities, Mental Retardation, Orthopedic Problems, Visual Defects

Measles
: Emotional or Behavioral Disorders, Learning Disabilities, Mental Retardation, Visual Defects

Otitis Media
: Brain Damage, Cleft Lip and/or Palate, Emotional or Behavioral Disorders, Mental Retardation, Perceptual Motor Disorders

Fever
: Emotional or Behavioral Disorders, Learning Disabilities, Mental Retardation, Perceptual Motor Disorders

Trauma
: Brain Damage, Cerebral Palsy, Emotional or Behavioral Disorders, Mental Retardation, Perceptual Motor Disorders.

Causes by Family History

Tables 7 and 8 contain information on family history of hearing loss prior to age six according to reported causes of hearing loss. This information is based on responses to questions on the data collection forms which asked whether or not each of the parents and siblings of the students was known to have a hearing loss prior to the time that these relatives were six years of age.

The data in Detailed Tables 7 and 8 are summarized in Tables L and M and Charts 5 and 6. Table L indicates that about 78 percent of the students for whom "Heredity" was reported as the cause of hearing loss had one or more members of the immediate family who had developed a hearing loss prior to age six. For about 12 percent of these students no family member had a hearing loss, and for 10 percent information about the family was not available. For all students with onset of loss at birth, about 21 percent had another family member with hearing loss of early onset (under age 6), and for about 50 percent of these students there were no other members of the family with a hearing loss. When the students for whom "Heredity" was reported as the cause were excluded from the computations, it was found that 55 percent had no other family members with a hearing loss and 14 percent had one or more family members with a hearing loss. Unfortunately, the information about family members was not available for about 31 percent of the students. For the specified pre-natal causes of hearing loss, the proportion of students who had another member of the family with a hearing loss ranged from about six percent for "Rubella" to about 17 percent for "Rh Incompatibility."

Family history of hearing loss prior to age six is summarized in Table M for students whose hearing loss was reported as due to post-natal causes. The data for all students are heavily influenced by the large number of students for whom the cause of loss and

TABLE L: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX			
	Total	No Parents No Siblings With Loss	1 or More Parents or Siblings With Loss	Unable to Classify
Total All Causes	100.0	50.4	21.2	28.4
Total Specified Causes	100.0	53.9	22.9	23.2
Maternal Rubella	100.0	67.3	6.0	26.7
Trauma To Mother During Pregnancy	100.0	58.5	15.8	25.7
Medication During Pregnancy	100.0	64.2	15.5	20.3
Prematurity	100.0	62.6	10.3	27.1
Rh Incompatibility	100.0	59.5	17.2	23.3
Heredity	100.0	11.6	78.3	10.2
Other Complications of Pregnancy	100.0	62.5	11.3	26.3
Trauma During Delivery	100.0	63.4	11.6	25.0
All Other Specified Pre-natal Causes	100.0	53.6	16.4	30.0
Onset of Loss At Birth But Cause Not Determined	100.0	55.5	21.9	22.6
Onset of Loss At Birth But Cause Not Reported	100.0	29.9	14.2	55.9

family history were not reported. When these students were omitted from the computations, it was determined that about 53 percent of these students had no family members with a hearing loss, 15 percent had one or more family members with a hearing loss, and the data were not reported for 33 percent. These proportions are almost identical to the proportions for students with onset of loss at birth when the "Hereditary" cases are excluded.

With reference to the specified post-natal causes of hearing loss, the data indicate that when "Meningitis" was reported as the cause of loss, about eight percent of the students had a family member with hearing loss. For the other specified causes the proportion of students who had a family member with a hearing loss ranged from about 13 to 18 percent.

These data raise some questions as to the true number of genetically linked cases of hearing loss among these students. In the absence of other information, geneticists generally assume that if a hearing impaired person has a parent or sibling who is hearing impaired, the hearing loss is due to genetic factors.

CHART 5: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX: UNITED STATES, 1970-71 SCHOOL YEAR.

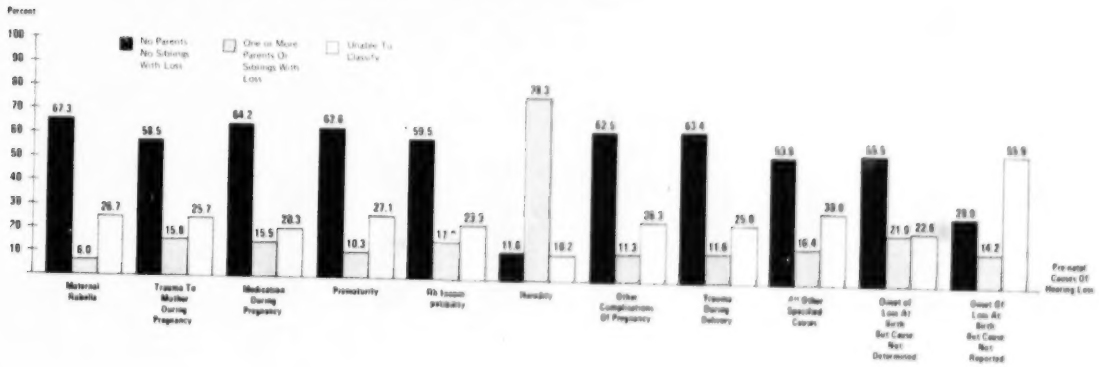


TABLE M: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX			
	Total	No Parents No Siblings With Loss	1 or More Parents or Siblings With Loss	Unable to Classify
Total All Causes	100.0	38.1	13.1	48.8
Total Specified Causes	100.0	52.6	13.5	33.8
Meningitis	100.0	60.4	7.5	32.1
Mumps	100.0	43.9	13.1	43.0
Measles	100.0	49.2	17.8	33.0
Otitis Media	100.0	43.9	12.9	43.1
Fever	100.0	54.8	14.8	30.4
Trauma	100.0	51.2	14.0	34.8
All Other Specified Post-natal Causes	100.0	52.0	17.0	31.1
Onset of Loss After Birth But Cause Not Determined	100.0	47.1	21.5	31.4
Onset of Loss After Birth But Cause Not Reported	100.0	15.1	9.4	75.6

CHART 6: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX: UNITED STATES, 1970-71 SCHOOL YEAR.

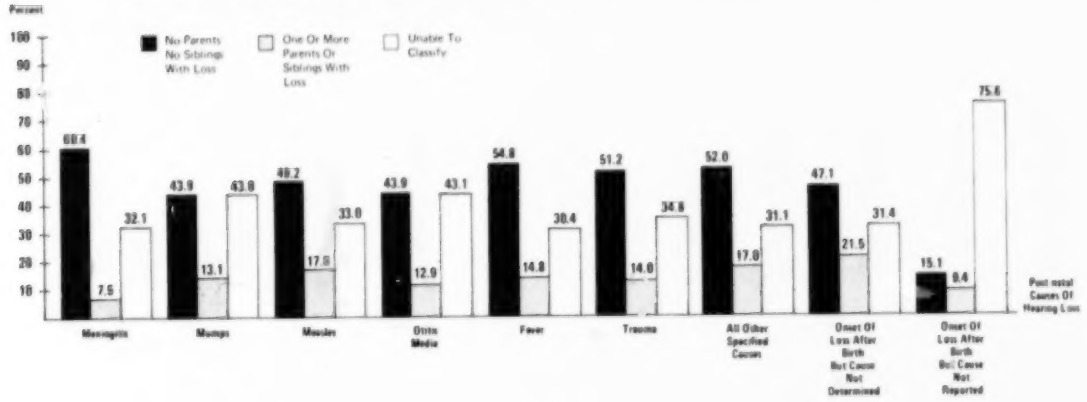


TABLE N: SUMMARY OF FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS: UNITED STATES, 1970-71 SCHOOL YEAR.

	Number	Percent
Total Causes	43,410	100.0
Heredity	3,073	7.1
Pre-natal Causes With One or More Family Members With History Of Hearing Loss	3,619	8.3
Post-natal Causes With One or More Family Members With History Of Hearing Loss	1,963	4.5
All Causes With No Family History Of Hearing Loss	19,682	45.3
Specified Causes Except Heredity; Unable to Determine If Any Family History Of Hearing Loss	5,936	13.7
Cause Unknown; Unable To Determine If Any Family History Of Hearing Loss	9,137	21.0

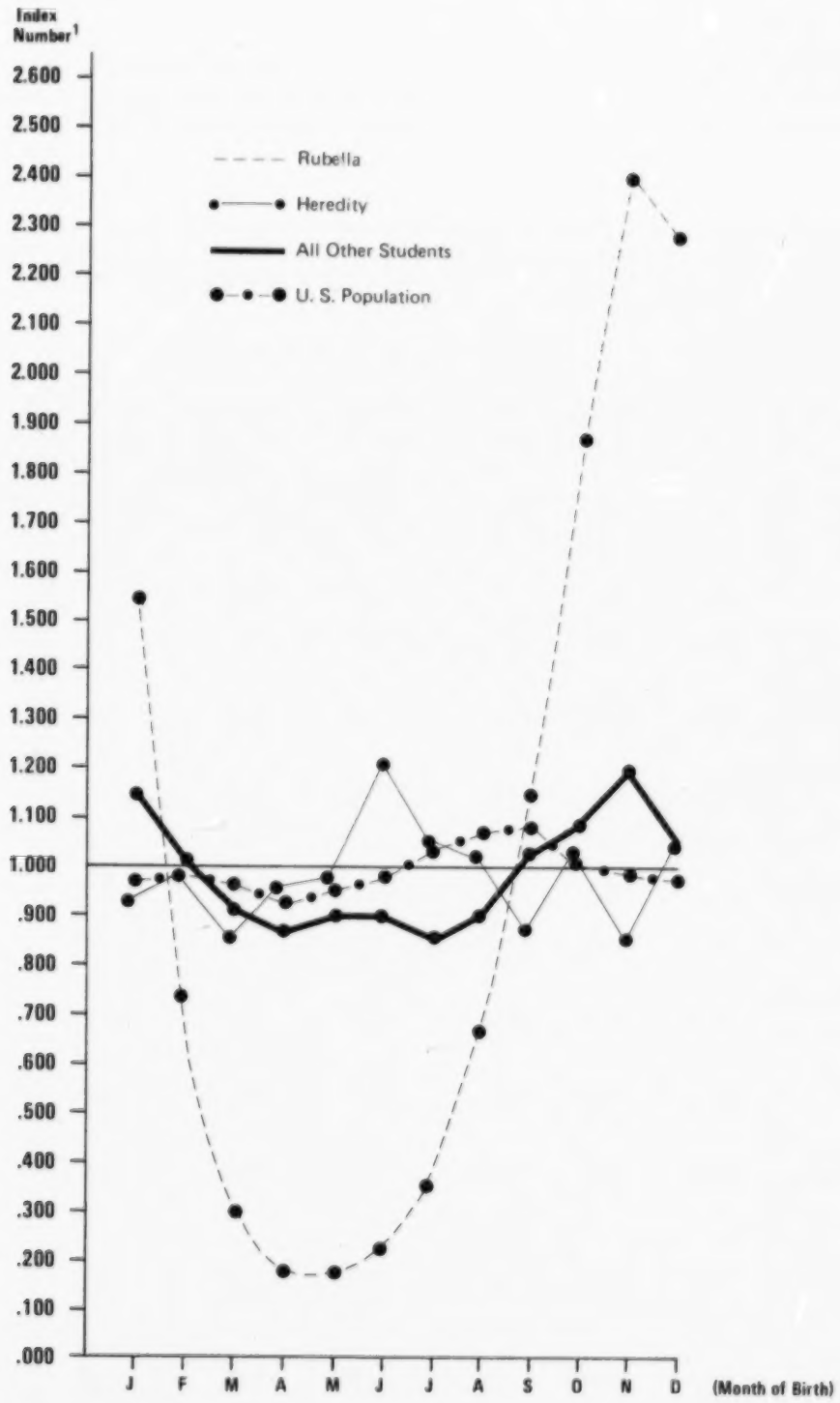
Granted this assumption, the data in Table N indicate that the cause of hearing loss for almost 20 percent of the students is genetically related. It must be emphasized that this proportion represents a minimum value since it is likely that a substantial number of students for whom family history was not reported (34.7 percent) has one or more family members with a hearing loss of early onset. Adjustments of these data in which these various assumptions are used to account for the students for whom the family history is unknown yield estimates that between 30 and 40 percent of all students in this study have one or more family members who also have a hearing loss.

Prevention of Deafness and Causes of Hearing Loss

Before going on to further analysis of these data it seems appropriate to comment on the need for better information as to the causes of hearing loss if we are to have more effective programs of prevention. Professionals working with hearing impaired persons can play an important role in this area.

The principal author of this report, using data from the Annual Survey and the National Census of the Deaf, has been following a different approach in trying to determine the environmental causes of hearing loss. This approach is illustrated by the data in Chart 7. The chart gives the index of month of birth of hearing impaired students whose onset of loss was at birth and the index of month of birth for the general population of the United States. These indices show the percentage of children born in a given month that is above and below the average number of children born each month. Shown are the indices of month of birth for students for whom "Rubella" and "Heredity" were reported as the causes of hearing loss.

CHART 7: MONTHLY INDEX OF BIRTHS, HEARING IMPAIRED STUDENTS BORN BETWEEN 1960 AND 1970.



[1] Ratio of actual number of births in a given month to the average number of births per month.

Also shown is the index for all other students whose onset of hearing loss was at birth but for whom "Rubella" or "Heredity" was not the reported cause of hearing loss. For comparison purposes the month of birth index for the general population is shown.

Analysis of these data is continuing and will be published at a later date. For the purpose of this report, we would like to point out the different seasonal pattern of births of students whose hearing loss was reported as due to "Maternal Rubella." Studies of hearing impaired persons born prior to 1960 also show the same seasonal pattern and indicate that "Rubella" was a causative factor long before 1964-65. If such studies had been carried out at an earlier date, we would have had some clue to this problem long before the rubella virus was isolated from the newborn

TABLE O: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE OF DISCOVERY OF HEARING LOSS: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	AGE OF DISCOVERY						
	All Ages	Under 1 Year	1 Year, Under 2 Years	2 Years, Under 3 Years	3 Years, Under 6 Years	6 Years or Older	Data Not Reported
Total All Causes	100.0	13.9	15.5	12.9	12.9	4.1	40.6
Total Specified Causes	100.0	16.4	17.5	14.0	13.5	3.5	35.1
Maternal Rubella	100.0	18.9	20.8	16.3	10.3	1.1	32.6
Trauma To Mother During Pregnancy	100.0	15.0	20.6	16.6	17.4	4.7	25.7
Medication During Pregnancy	100.0	18.8	21.4	14.8	18.8	3.3	22.9
Prematurity	100.0	12.4	15.4	15.6	19.2	6.0	31.4
Rh Incompatibility	100.0	15.1	16.6	14.1	16.6	5.0	32.6
Heredity	100.0	15.6	14.4	9.1	10.2	3.7	47.0
Other Complications of Pregnancy	100.0	15.4	18.4	14.5	20.9	6.2	24.5
Trauma During Delivery	100.0	15.6	13.6	12.9	18.7	6.8	32.4
All Other Specified Causes	100.0	16.0	13.3	10.4	11.0	4.4	45.0
Onset of Loss At Birth But Cause Not Determined	100.0	13.0	16.2	14.2	13.2	4.0	39.4
Onset of Loss At Birth But Cause Not Reported	100.0	6.9	7.5	7.0	10.4	6.5	61.7

TABLE P: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE OF DISCOVERY OF HEARING LOSS: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	AGE OF DISCOVERY						
	All Ages	Under 1 Year	1 Year, Under 2 Years	2 Years, Under 3 Years	3 Years, Under 6 Years	6 Years or Older	Data Not Reported
Total All Causes	100.0	7.7	13.4	11.7	16.5	13.4	37.2
Total Specified Causes	100.0	11.8	19.0	15.6	22.0	15.4	16.2
Meningitis	100.0	17.1	23.3	18.4	19.1	5.0	17.2
Mumps	100.0	4.3	7.1	10.0	26.2	35.9	16.5
Measles	100.0	9.0	17.8	14.6	25.3	17.1	16.2
Otitis Media	100.0	4.7	10.4	9.8	22.7	40.1	12.3
Fever	100.0	9.6	21.3	20.1	23.6	9.7	15.8
Trauma	100.0	8.6	14.3	16.0	28.6	17.4	15.2
All Other Specified Post-natal Causes	100.0	14.2	21.6	15.7	20.1	11.3	17.2
Onset of Loss After Birth But Cause Not Determined	100.0	7.0	16.3	16.3	21.8	16.1	22.5
Onset of Loss After Birth But Cause Not Reported	100.0	2.4	4.8	4.7	7.2	9.6	71.2

in 1966. The seasonal pattern of births for all other students whose onset of hearing loss was at birth, except for the month of June, is similar to the pattern for "Rubella." This suggests the possibility that "Rubella" also may have been the causative agent among some of these students. Another possibility is that communicable diseases such as "Strep Throat," "Mumps," and "Measles," which have their highest prevalence during the same period of the year as "Rubella," also may be causative agents.

It has been stated that "if all of the knowledge now available could be put into use by physicians, by public health officials and especially by individuals who are still to become parents, probably more than half of the birth defects which now occur could be prevented."[1] To this I would add that all professionals working in the area of deafness have an obligation to put the available knowledge to use.

Cause of Hearing Loss by Age of Discovery of Loss

The students' ages at time of discovery of the hearing loss by the cause of hearing loss are presented in Tables 9 and 10. Percentage distributions of these data are shown in Tables O and P. The large proportion (about 40 percent) of students for whom age of discovery of loss was not reported should be taken into consideration in interpreting the data in these

[1] Apgar, Virginia and Beck, Joan, *Is My Baby All Right?*, Trident Press, New York, 1972, p. 435.

TABLE Q: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY HEARING THRESHOLD LEVELS[1]: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	HEARING THRESHOLD LEVELS						
	All Hearing Threshold Levels (ISO)	Under 45dB	45dB to 64dB	65dB to 84dB	85dB to 98dB	99dB & Over	Unknown
Total All Causes	100.0	4.9	10.5	20.6	20.1	22.2	21.7
Total Specified Causes	100.0	4.2	10.8	22.0	20.1	21.0	22.0
Maternal Rubella	100.0	2.1	6.7	23.2	20.3	20.8	26.8
Trauma To Mother During Pregnancy	100.0	8.7	11.9	13.4	24.9	21.3	19.8
Medication During Pregnancy	100.0	5.2	13.3	19.9	18.8	20.7	22.1
Prematurity	100.0	5.7	15.7	25.6	19.9	16.9	16.2
Rh Incompatibility	100.0	3.7	13.3	27.5	23.5	15.8	16.2
Heredity	100.0	4.3	9.3	16.6	20.9	27.9	21.0
Other Complications of Pregnancy	100.0	5.7	16.6	21.6	17.0	17.8	21.2
Trauma During Delivery	100.0	7.9	14.3	22.2	18.0	20.1	17.6
All Other Specified Causes	100.0	7.8	15.6	17.5	15.5	21.0	22.4
Onset of Loss At Birth But Cause Not Determined	100.0	4.2	9.2	18.5	21.3	26.4	20.4
Onset of Loss At Birth But Cause Not Reported	100.0	8.2	11.6	19.2	18.4	19.7	22.9

[1] Average hearing threshold in better ear computed at 500, 1000, 2000 cycles per second.

TABLE R: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY HEARING THRESHOLD LEVELS[1]: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	HEARING THRESHOLD LEVELS						
	All Hearing Threshold Levels (ISO)	Under 45dB	45dB to 64dB	65dB to 84dB	85dB to 98dB	99dB & Over	Unknown
Total All Causes	100.0	16.2	10.7	16.5	15.8	18.9	21.8
Total Specified Causes	100.0	17.4	9.7	15.7	15.4	21.8	20.1
Meningitis	100.0	3.3	4.9	13.9	15.2	35.1	27.6
Mumps	100.0	38.7	11.1	13.1	10.5	12.0	14.5
Measles	100.0	21.0	13.9	16.9	18.5	16.3	13.4
Otitis Media	100.0	47.7	12.0	9.7	6.8	7.9	16.0
Fever	100.0	12.9	12.3	19.4	14.8	17.0	23.6
Trauma	100.0	18.8	12.9	17.6	14.8	16.9	19.0
All Other Specified Post-natal Causes	100.0	12.9	9.2	18.4	19.1	22.0	18.3
Onset of Loss After Birth But Cause Not Determined	100.0	12.7	12.9	18.7	17.8	18.9	19.0
Onset of Loss After Birth But Cause Not Reported	100.0	15.9	11.4	16.9	15.6	15.1	25.1

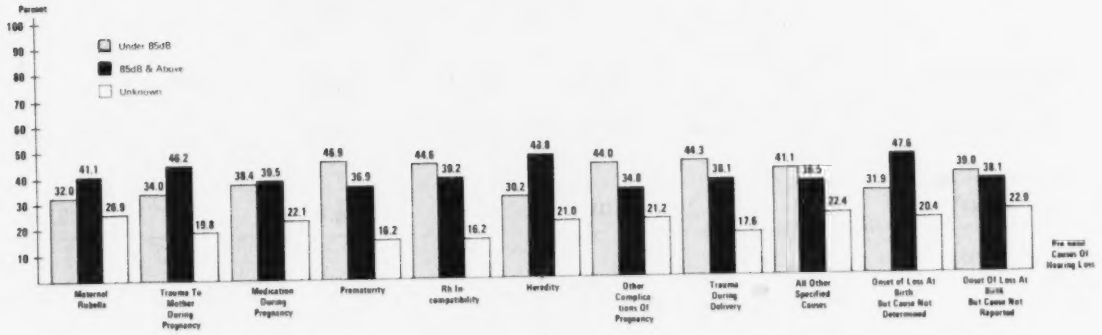
[1] Average hearing threshold in the better ear computed at 500, 1000, 2000 cycles per second.

tables. These data indicate that cases of hearing loss due to "Rubella" and "Medication During Pregnancy" are discovered during the first two years of life more frequently (about 40 percent) than hearing loss due to the other specified causes. Among the listed post-natal causes of hearing loss, cases due to "Meningitis" and "Fever" are discovered more frequently during the first two years of life than cases due to other causes.

Causes of Hearing Loss by Hearing Threshold Levels

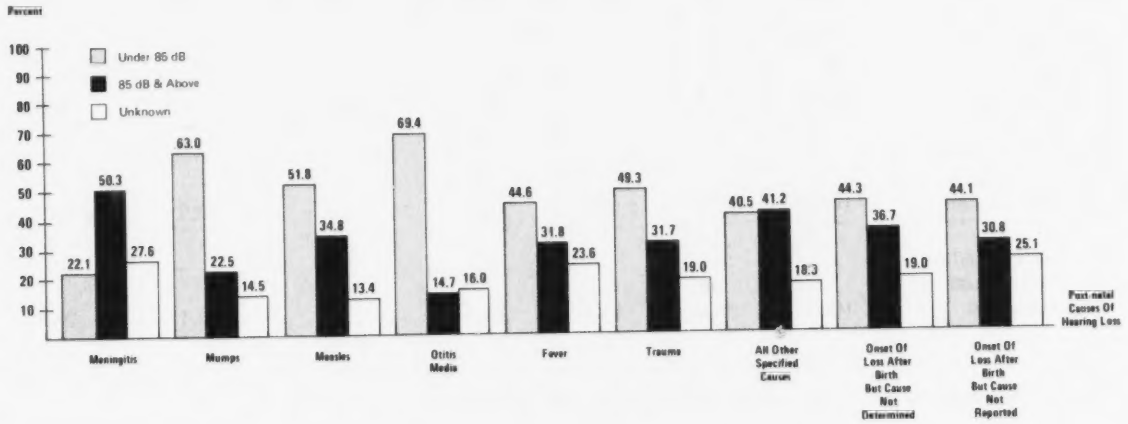
Causes of hearing loss in relation to hearing threshold levels, or better-ear-averages, are presented in Detailed Tables 11 and 12. Percentage distributions of these data are shown in Tables Q and R and Charts 8 and 9. These data indicate that students whose hearing loss was reported due to pre-natal causes have higher hearing threshold levels than the students whose hearing problem was due to post-natal causes. For example, only five percent of the students in the former group have hearing levels below 45 decibels while there are 16 percent in the latter group. At the upper end of the scale about 42 percent of students whose hearing loss was due to pre-natal causes have threshold levels of 85 decibels or higher, compared to about 35 percent for students whose hearing loss was due to post-natal causes.

CHART 8: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY HEARING THRESHOLD LEVELS[1]: UNITED STATES, 1970-71 SCHOOL YEAR.



[1] Average hearing threshold in better ear computed at 500, 1000, 2000 cycles per second.

CHART 9: PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY HEARING THRESHOLD LEVELS[1]: UNITED STATES, 1970-71 SCHOOL YEAR.



[1] Average hearing threshold in better ear computed at 500, 1000, 2000 cycles per second.

Among the pre-natal causes of hearing loss "Heredity" (48.8 percent), "Trauma to Mother During Pregnancy" (46.2 percent), and "Rubella" (41.1 percent) have the highest proportion of cases with thresholds of 85 decibels or higher. "Prematurity" (41.3 percent), "Rh Incompatibility" (40.8 percent), and "Other Complications of Pregnancy" (38.2 percent) are the causes with the highest proportion of cases in the threshold range between 45-84 decibels. "Trauma to Mother During Pregnancy" (8.7 percent), "Trauma During Delivery" (7.9 percent), and "All other Specified Causes" (7.8 percent) are the causes with the highest percentage of cases with threshold levels under 45 decibels.

Among the post-natal causes of hearing loss, "Meningitis" (50.3 percent) and "All Other Specified Causes" (41.1 percent) have by far the highest

TABLE S: PERCENTAGE DISTRIBUTION OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY TYPE OF EDUCATIONAL PROGRAM: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	TYPE OF EDUCATIONAL PROGRAM							
	All Schools	Residential School for the Deaf	Classes for the Hearing Impaired	Day School for the Deaf	Program for the Multiply Handicapped	Itinerant & Part Time Special Educational Services	Speech & Hearing Clinics	Other
Total All Causes	100.0	45.7	33.8	6.6	1.7	9.6	1.9	0.7
Total Specified Causes	100.0	42.0	37.8	7.2	2.3	8.1	2.0	0.6
Maternal Rubella	100.0	34.3	45.4	10.1	2.7	5.1	2.2	0.2
Trauma To Mother During Pregnancy	100.0	32.0	45.8	7.1	4.7	6.3	2.8	1.2
Medication During Pregnancy	100.0	32.8	42.1	7.7	1.5	10.7	4.8	0.4
Prematurity	100.0	38.1	39.3	7.2	3.0	9.9	1.9	0.6
Rh Incompatibility	100.0	45.9	33.4	5.6	1.6	10.7	2.4	0.4
Heredity	100.0	59.5	25.2	3.0	0.7	9.6	1.2	0.9
Other Complications of Pregnancy	100.0	28.7	45.6	7.9	3.6	10.7	3.1	0.4
Trauma During Delivery	100.0	43.7	33.7	6.3	3.5	10.3	1.4	1.1
All Other Specified Pre-natal Causes	100.0	57.2	23.5	5.0	1.7	9.6	0.8	2.3
Onset of Loss At Birth But Cause Not Determined	100.0	53.5	27.2	6.0	0.7	9.7	2.3	0.6
Onset of Loss At Birth But Cause Not Reported	100.0	45.6	30.8	5.5	1.2	14.4	1.0	1.4

TABLE 7. PERCENTAGE DISTRIBUTION OF REPORTED POST-NATAL CAUSES OF HEARING LOSS AMONG STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PRORGAMS FOR THE HEARING IMPAIRED BY TYPE OF EDUCATIONAL PROGRAM: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	TYPE OF EDUCATIONAL PROGRAM							
	All Schools	Residential School for the Deaf	Classes for the Hearing Impaired	Day School for the Deaf	Program for the Multiply Handicapped	Itinerant & Part Time Special Educational Services	Speech & Hearing Clinics	Other
Total All Causes	100.0	42.5	26.6	8.0	1.6	13.6	0.9	6.8
Total Specified Causes	100.0	41.9	28.4	5.5	2.0	14.8	1.3	6.1
Meningitis	100.0	51.6	30.5	7.4	0.9	6.9	1.8	0.7
Mumps	100.0	21.9	28.5	3.7	5.1	26.2	0.3	14.2
Measles	100.0	38.9	27.5	4.2	3.8	17.8	0.4	7.5
Otitis Media	100.0	16.6	26.4	3.0	3.2	30.2	2.6	17.9
Fever	100.0	35.4	38.9	4.8	1.3	16.6	2.2	1.0
Trauma	100.0	39.0	29.5	5.5	2.1	15.5	0.5	7.9
All Other Specified Post-natal Causes	100.0	51.5	24.0	6.1	1.0	11.4	0.7	5.2
Onset of Loss After Birth But Cause Not Determined	100.0	53.2	22.8	4.9	1.1	13.1	0.7	4.2
Onset of Loss After Birth But Cause Not Reported	100.0	39.5	25.7	12.5	1.4	12.0	0.4	8.6

percentage of cases with hearing threshold levels of 85 decibels or higher. The causes with highest percentage of cases in the middle ranges, 45 to 84 decibels, are "Fever" (31.7 percent), "Measles" (30.8 percent), and "Trauma" (30.5 percent). "Otitis Media" (47.7 percent) and "Mumps" (38.7 percent) have by far the largest proportion of cases with threshold levels under 45 decibels.

Causes of Hearing Loss by Type of School Program

The reported causes of hearing loss are shown in Detailed Tables 13 and 14 in relation to the type of educational program that these students were enrolled in during the 1970-71 school year. These relationships are shown in the form of percentage distributions in Tables S and T.

The distribution patterns of pre-natal and post-natal causes of hearing loss shown in Tables S and T need to be considered in terms of the distribution of the 41,109 students enrolled in programs that participated in the Annual Survey for the 1970-71 school year (see below).

	Percent
ALL PROGRAMS	100.0
Residential School for the Deaf	45.5
Classes for the Hearing Impaired	30.8
Day School for the Deaf	7.2
Program for the Multiply Handicapped	1.5
Itinerant and Part-Time Special Educational Services	10.7
Speech and Hearing Clinics	1.5
Other Programs	2.9

When examined in relation to the proportion enrolled in these types of schools, it may be seen that the residential schools have a higher proportion of students who reported "Heredity," "Other Specified Causes," and "Cause Not Determined" and a lower proportion of students who reported "Rubella" and most of the other pre-natal causes. With respect to post-natal causes, "Meningitis," "All Other Specified Causes," and "Cause Not Determined" are the causes more frequently reported for students in residential schools. Similar disparities between the proportion of students with a specified cause of hearing loss enrolled in each program can be found in these tables.

In order to determine the reasons for the above phenomena, it is necessary to examine also the chronological age of the students and the severity of loss, measured by hearing threshold levels. When these factors are considered conjointly, it appears that, relatively speaking, the youngest students and those whose loss was caused by conditions that result in less severe loss are enrolled in day schools and classes for the hearing impaired. An exception to this statement is that a high proportion of the "Rubella" students, regardless of severity, was enrolled in day schools and classes. Proportionately, the older students (above seven years of age) and those with causative agents which are usually associated with more severe losses are enrolled in residential schools. As might be expected, students whose hearing loss was due to conditions that generally result in less severe losses, "Measles," "Mumps," and "Otitis Media," are more frequently found in itinerant and other part-time programs.

SUMMARY

The reported causes of hearing loss for 41,109 students enrolled in programs participating in the Annual Survey of Hearing Impaired Children and Youth during the 1970-71 school year have been presented. These data indicate that for almost two-thirds of the students the causes of hearing loss were due to pre-natal causes. Post-natal causes were reported for about one-third of the students. "Maternal Rubella" was reported as the greatest single cause of hearing loss. With respect to "Rubella," these data can serve as a baseline to measure, in a few years, the effectiveness of the ongoing "Rubella" vaccination program.

The "Cause of Loss" data have been presented in relationship to other significant characteristics of the students. The tables showing "Cause of Loss" in relation to additional handicapping conditions and severity of loss may be of particular importance in future research studies of the hearing impaired.

Again, we would like to reiterate the need for better etiological information as a basis for a more effective program to prevent deafness.

In conclusion, in spite of the limitations of these data, in terms of diagnostic validity and the large number of students for whom the cause was not determined or not reported, they have been presented to stimulate and encourage the following:

—Improvement in the collection of causative data
—A better understanding of the hearing impaired population
—Research into the prevention of deafness
—Research into the joint association of environmental and genetic factors in the causation of hearing loss
—Research into the relationship between causes of deafness and intelligence, academic achievement and language and communication skills.

The extent to which the above actions occur will determine the usefulness of this effort.

LIST OF DETAILED TABLES

Table 1: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age and Sex: United States, 1970-71 School Year.

Table 2: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age and Sex: United States, 1970-71 School Year.

Table 3: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Number of Additional Handicapping Conditions: United States, 1970-71 School Year.

Table 4: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Number of Additional Handicapping Conditions: United States, 1970-71 School Year.

Table 5: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Types of Additional Handicapping Conditions: United States, 1970-71 School year.

Table 6: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Types of Additional Handicapping Conditions: United States, 1970-71 School year.

Table 7: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Family History of Hearing Loss Prior to Age Six: United States, 1970-71 School Year.

Table 8: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Family History of Hearing Loss Prior to Age Six: United States, 1970-71 School Year.

Table 9: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age of Discovery: United States, 1970-71 School Year.

Table 10: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Age of Discovery: United States, 1970-71 School Year.

Table 11: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Hearing Threshold Levels: United States, 1970-71 School Year.

Table 12: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Hearing Threshold Levels: United States, 1970-71 School Year.

Table 13: Number of Reported Pre-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Type of Educational Program: United States, 1970-71 School Year.

Table 14: Number of Reported Post-natal Causes of Hearing Loss of Students Enrolled in Participating Special Educational Programs for the Hearing Impaired by Type of Educational Program: United States, 1970-71 School Year.

TABLE 1: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AND SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	BOTH SEXES																			
	Total All Ages	CHRONOLOGICAL AGE OF STUDENTS																		
		Under 3 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years & Over
Total All Causes	28,402	370	570	1,045	2,322	4,136	1,523	1,495	1,510	1,791	2,183	2,480	1,712	1,556	1,476	1,312	1,205	1,024	498	194
Total Specified Causes	16,037	199	321	650	1,724	3,063	811	748	738	904	1,126	1,383	862	769	740	663	574	487	204	86
Maternal Rubella	6,077	81	141	314	1,203	2,256	238	135	116	185	390	505	115	91	48	55	77	94	20	13
Trauma To Mother During Pregnancy	253	2	6	7	22	35	13	18	15	16	14	26	8	16	19	9	12	6	8	1
Medication During Pregnancy	271	9	6	17	18	38	11	16	21	16	23	29	14	15	11	11	7	5	1	–
Prematurity	2,207	25	34	73	128	209	127	132	126	154	161	218	173	160	157	132	99	54	30	15
Rh Incompatibility	1,402	13	31	43	62	100	69	74	71	119	95	118	113	96	106	96	88	64	25	19
Heredity	3,073	35	58	107	156	198	193	194	212	210	237	249	223	199	212	215	161	130	64	20
Other Complications of Pregnancy	994	14	22	48	63	99	53	69	52	73	78	80	82	66	64	49	44	30	6	2
Trauma During Delivery	916	10	11	22	28	75	51	59	70	66	63	85	70	66	68	60	45	34	24	9
All Other Specified Causes	844	10	12	19	44	53	56	61	55	65	65	73	64	60	55	41	41	40	23	7
Onset of Loss At Birth But Cause Not Determined	7,741	133	174	275	399	660	470	461	470	550	608	672	522	480	428	399	390	399	188	63
Onset of Loss At Birth But Cause Not Reported	4,624	38	75	120	199	413	242	276	302	337	449	425	328	307	308	245	241	168	106	45

TABLE 1 (continued): NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AND SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	MALES																			
	Total All Ages	CHRONOLOGICAL AGE OF STUDENTS																		
		Under 3 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years & Over
Total All Causes	15,204	192	300	569	1,183	2,134	800	750	810	1,011	1,161	1,322	951	822	806	756	664	557	286	121
Total Specified Causes	8,517	96	172	351	876	1,572	430	387	401	516	585	738	482	389	390	389	314	258	114	57
Maternal Rubella	3,016	37	71	162	591	1,157	111	60	53	96	182	248	58	39	20	24	36	48	15	8
Trauma To Mother During Pregnancy	124	–	2	5	12	14	4	11	7	8	7	16	3	6	8	5	7	5	4	–
Medication During Pregnancy	151	5	6	6	10	18	8	12	11	10	14	14	6	7	8	7	4	3	2	–
Prematurity	1,211	16	20	44	79	106	62	66	70	89	84	124	97	76	86	77	55	33	17	10
Rh Incompatibility	862	7	15	23	31	58	46	42	46	75	60	74	77	63	58	62	53	41	18	13
Heredity	1,616	13	30	59	87	103	96	91	123	108	123	131	119	102	106	112	90	75	33	15
Other Complications of Pregnancy	542	10	11	26	32	52	35	36	32	47	39	45	44	33	30	32	22	12	2	2
Trauma During Delivery	532	4	9	15	11	39	35	34	37	49	36	41	35	38	40	42	27	20	13	7
All Other Specified Causes	463	4	8	11	23	25	33	35	22	34	40	45	43	25	34	28	20	21	10	2
Onset of Loss At Birth But Cause Not Determined	4,173	72	89	150	210	348	239	230	246	307	339	363	291	269	244	214	218	206	104	34
Onset of Loss At Birth But Cause Not Reported	2,514	24	39	68	97	214	131	142	163	188	237	221	178	164	172	153	132	93	68	30

TABLE 1 (continued): NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AND SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	FEMALES																		
		CHRONOLOGICAL AGE OF STUDENTS																	
	Total All Ages	Under 3 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years & Over
Total All Causes	13,198	178	270	476	1,139	2,002	723	736	700	780	1,022	1,158	761	734	670	541	541	467	212	73
Total Specified Causes	7,520	103	149	299	848	1,491	391	371	337	388	541	645	380	380	350	264	260	199	90	29
Maternal Rubella	3,061	44	70	152	412	1,099	127	75	63	89	208	257	57	52	28	31	41	46	5	5
Trauma To Mother During Pregnancy	129	2	4	2	10	21	9	7	8	8	7	10	5	10	11	4	5	1	4	1
Medication During Pregnancy	120	4	–	11	8	20	3	4	10	6	9	15	8	8	3	4	3	2	2	–
Prematurity	996	9	14	28	49	103	65	66	56	65	77	94	76	84	71	55	44	21	13	5
Rh Incompatibility	540	6	16	20	31	42	23	32	25	44	35	44	36	33	48	34	35	23	7	6
Heredity	1,457	22	28	48	68	95	97	103	89	102	114	118	104	97	106	103	71	55	31	5
Other Complications of Pregnancy	452	4	11	22	31	47	18	33	20	26	39	35	38	33	34	17	22	18	4	–
Trauma During Delivery	384	6	2	7	17	36	16	25	33	17	27	44	35	28	28	18	18	14	11	2
All Other Specified Causes	381	6	4	8	21	28	23	26	33	31	25	28	21	35	21	13	21	19	13	5
Onset of Loss At Birth But Cause Not Determined	3,568	61	85	125	189	312	231	231	224	243	269	309	231	211	184	185	172	193	84	29
Onset of Loss At Birth But Cause Not Reported	2,110	14	36	52	102	199	111	134	139	149	212	204	150	143	136	92	109	75	38	15

TABLE 2: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AND SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	BOTH SEXES																				
	CHRONOLOGICAL AGE OF STUDENTS																				
	Total All Ages	Under 3 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years & Over
Total All Causes	15,008	96	226	370	695	1,183	923	1,008	1,014	1,137	1,251	1,387	1,029	1,029	992	822	807	584	290	188
Total Specified Causes	7,457	53	125	217	327	472	450	526	482	550	595	685	487	563	513	435	428	290	170	94
Meningitis	2,017	29	53	101	125	145	147	150	138	157	144	181	114	102	97	109	88	84	50	25
Mumps	351	–	3	6	9	18	18	26	25	33	27	35	19	30	26	17	23	12	4	4
Measles	1,114	3	4	7	30	46	54	74	79	80	106	117	74	88	80	70	93	44	31	20
Otitis Media	927	9	12	32	32	63	65	87	63	77	82	79	62	67	68	49	41	18	18	9
Fever	628	5	24	25	38	55	41	43	34	41	39	60	30	50	36	35	26	20	10	5
Trauma	420	4	4	6	18	27	18	28	25	21	30	37	30	39	38	28	33	21	9	6
All Other Specified Causes	2,000	3	25	40	75	118	107	117	118	132	168	132	140	177	164	121	136	83	90	26
Onset of Loss After Birth But Cause Not Determined	2,043	19	34	42	83	167	127	135	133	167	180	186	156	130	133	115	110	87	46	19
Onset of Loss After Birth But Cause Not Reported	5,508	24	67	111	285	544	346	348	400	420	456	497	387	366	348	272	269	217	74	56

TABLE 2 (continued): NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AND SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	FEMALES																				
	CHRONOLOGICAL AGE OF STUDENTS																				
	Total All Ages	Under 3 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years & Over
Total All Causes	6,730	40	101	158	330	532	437	442	416	519	582	615	467	488	480	386	376	248	123	80
Total Specified Causes	3,217	21	51	83	148	189	193	212	187	245	255	303	204	252	237	194	199	124	78	44
Meningitis	727	11	17	34	48	54	55	50	43	60	55	56	39	42	34	48	29	29	17	8
Mumps	184	–	2	2	3	6	10	12	6	12	14	22	7	14	22	8	14	5	1	4
Measles	572	2	3	5	18	28	24	30	38	47	53	67	28	44	44	38	52	26	17	10
Otitis Media	401	4	6	11	18	24	24	29	35	36	32	30	25	34	33	23	20	5	7	5
Fever	273	1	6	10	17	23	21	22	11	16	16	23	18	26	19	15	12	10	5	2
Trauma	170	2	3	2	9	13	8	14	8	5	12	15	14	13	15	11	10	11	2	3
All Other Specified Causes	910	1	14	19	35	43	51	55	40	69	73	90	73	79	70	53	62	38	27	12
Onset of Loss After Birth But Cause Not Determined	952	11	18	21	46	67	80	61	57	80	89	78	70	83	56	60	54	33	15	8
Onset of Loss After Birth But Cause Not Reported	2,561	8	32	54	136	276	184	169	172	194	238	234	173	153	187	132	123	90	32	28

TABLE 2 (continued): NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE AND SEX: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	MALES																			
	CHRONOLOGICAL AGE OF STUDENTS																			
	Total All Ages	Under 3 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years & Over
Total All Causes	8,278	56	125	212	365	651	486	566	599	618	680	762	582	561	542	456	431	346	173	88
Total Specified Causes	4,240	32	74	134	179	283	257	313	295	305	340	382	293	301	276	241	229	188	100	50
Meningitis	1,250	18	38	67	77	91	92	100	95	97	89	106	75	60	63	63	67	55	33	17
Mumps	167	–	1	4	6	12	9	14	19	21	13	17	12	16	18	9	9	7	3	–
Measles	542	1	1	2	12	20	30	44	41	42	52	50	46	44	36	38	41	19	19	10
Otitis Media	526	5	8	21	14	39	41	50	28	41	50	49	37	33	35	28	21	11	7	4
Fever	355	4	18	15	21	32	20	21	23	25	23	37	21	24	19	20	14	10	6	3
Trauma	250	2	1	4	9	14	10	14	17	16	19	22	25	20	23	17	13	10	6	3
All Other Specified Causes	1,099	2	11	21	40	75	56	62	72	63	95	102	67	98	84	68	74	56	32	13
Onset of Loss After Birth But Cause Not Determined	1,091	9	16	21	37	100	67	74	66	77	77	107	85	77	77	55	56	49	31	11
Onset of Loss After Birth But Cause Not Reported	1,947	15	35	57	149	268	162	179	237	236	252	283	214	183	189	160	146	131	42	28

TABLE 3: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS						
	Total Additional Handicapping Conditions	No Additional Handicapping Conditions	One Additional Handicapping Condition	Two Additional Handicapping Conditions	Three or More Additional Handicapping Conditions	Not Reported	Unable to Classify
Total All Causes	28,402	16,991	6,535	1,649	378	2,806	43
Total Specified Causes	16,037	8,887	4,107	1,157	269	1,590	27
Maternal Rubella	6,077	3,348	1,527	469	108	616	9
Trauma To Mother During Pregnancy	253	126	68	17	6	35	1
Medication During Pregnancy	271	140	69	25	8	28	1
Prematurity	2,207	1,019	714	221	53	195	5
Rh Incompatibility	1,402	632	477	112	26	152	3
Heredity	3,073	2,282	447	66	12	263	3
Other Complications of Pregnancy	994	476	288	96	23	108	3
Trauma During Delivery	916	401	283	96	25	110	1
All Other Specified Causes	844	463	234	55	8	83	1
Onset of Loss At Birth But Cause Not Determined	7,741	5,349	1,433	267	58	628	6
Onset of Loss At Birth But Cause Not Reported	4,624	2,755	995	225	51	588	10

TABLE 4: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	NUMBER OF ADDITIONAL HANDICAPPING CONDITIONS						
	Total Additional Handicapping Conditions	No Additional Handicapping Conditions	One Additional Handicapping Condition	Two Additional Handicapping Conditions	Three or More Additional Handicapping Conditions	Not Reported	Unable to Classify
Total All Causes	15,008	7,948	2,667	528	103	3,739	23
Total Specified Causes	7,459	4,720	1,549	335	63	778	12
Meningitis	2,017	1,287	417	77	21	211	4
Mumps	351	212	75	18	5	40	1
Measles	1,114	713	215	54	6	124	2
Otitis Media	927	560	216	54	7	88	2
Fever	628	377	111	24	3	112	1
Trauma	420	251	93	22	5	48	1
All Other Specified Causes	2,000	1,320	422	86	16	155	1
Onset of Loss After Birth But Cause Not Determined	2,043	1,354	399	60	14	212	4
Onset of Loss After Birth But Cause Not Reported	5,508	1,874	719	133	26	2,749	7

TABLE 5: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY TYPES OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	ADDITIONAL HANDICAPPING CONDITIONS												
	Total All Additional Handicapping Conditions	Brain Damage	Cerebral Palsy	Cleft Lip &/or Palate	Emotional or Behavioral Problems	Epilepsy	Heart Disorders	Learning Disabilities	Mental Retardation	Orthopedic Disorders	Perceptual Motor Disorders	Severe Visual	Other
Total All Causes	10,973	188	1,088	153	2,510	154	709	706	1,783	193	1,543	1,444	492
Total Specified Causes	7,226	132	835	80	1,530	100	573	407	1,064	113	1,012	1,064	316
Maternal Rubella	2,779	31	150	20	598	32	445	113	284	42	340	633	91
Trauma To Mother During Pregnancy	118	1	12	1	29	2	6	9	27	3	12	10	6
Medication During Pregnancy	148	4	9	1	31	3	7	11	23	2	27	11	11
Prematurity	1,312	24	182	13	254	15	46	79	259	17	200	176	47
Rh Incompatibility	781	17	277	7	110	8	14	44	92	5	122	58	27
Heredity	622	12	13	8	208	8	17	51	104	19	89	49	44
Other Complications of Pregnancy	548	17	60	8	110	9	18	37	110	10	92	50	27
Trauma During Delivery	557	22	79	4	124	14	11	42	115	4	86	39	17
All Other Specified Causes	369	4	53	18	66	9	9	21	50	11	44	38	46
Onset of Loss At Birth But Cause Not Determined	2,148	29	121	38	680	35	85	170	488	45	334	205	98
Onset of Loss At Birth But Cause Not Reported	1,599	27	142	35	390	19	51	129	319	35	197	175	80

TABLE 6: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY TYPES OF ADDITIONAL HANDICAPPING CONDITIONS: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	ADDITIONAL HANDICAPPING CONDITIONS												
	Total All Additional Handicapping Conditions	Brain Damage	Cerebral Palsy	Cleft Lip & /or Palate	Emotional or Behavioral Problems	Epilepsy	Heart Disorders	Learning Disabilities	Mental Retardation	Orthopedic Disorders	Perceptual Motor Disorders	Severe Visual	Other
Total All Causes	4,038	92	177	77	1,076	89	99	293	943	75	534	380	214
Total Specified Causes	2,420	64	92	50	647	54	57	156	535	40	363	231	131
Meningitis	633	17	22	3	168	29	9	41	135	8	111	52	38
Mumps	128	3	5	6	23	3	6	9	30	4	12	22	5
Measles	345	8	14	7	88	4	10	36	88	5	36	39	10
Otitis Media	349	10	7	20	93	4	7	12	97	5	47	30	17
Fever	170	2	8	–	42	2	8	6	38	–	25	25	14
Trauma	151	6	8	–	45	4	1	10	31	2	27	7	10
All Other Specified Causes	644	18	28	14	188	8	16	42	116	16	105	56	37
Onset of Loss After Birth But Cause Not Determined	556	12	27	5	153	10	11	46	141	16	58	44	32
Onset of Loss After Birth But Cause Not Reported	1,062	16	58	22	276	25	31	80	267	19	112	105	51

TABLE 7: NUMBER OF PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX						
	Total All Students	No Parents No Siblings With Loss	At Least One Parent No Siblings With Loss	At Least One Parent & 1 or More Siblings With Loss	1 Sibling and No Parents With Loss	2 or More Siblings No Parents With Loss	Unable to Classify
Total All Causes	28,402	14,321	839	1,067	2,909	1,209	8,057
Total Specified Causes	16,037	8,639	576	937	1,470	691	3,724
Maternal Rubella	6,077	4,091	65	8	269	21	1,623
Trauma To Mother During Pregnancy	253	148	5	4	26	5	65
Medication During Pregnancy	271	174	10	2	25	5	55
Prematurity	2,207	1,382	36	12	146	33	598
Rh Incompatibility	1,402	834	29	11	152	49	327
Heredity	3,073	356	374	889	625	517	312
Other Complications of Pregnancy	994	621	17	1	73	21	261
Trauma During Delivery	916	581	20	5	58	23	229
All Other Specified Causes	844	452	20	5	96	17	254
Onset of Loss At Birth But Cause Not Determined	7,741	4,299	138	74	1,099	384	1,747
Onset of Loss At Birth But Cause Not Reported	4,624	1,383	125	56	340	134	2,586

TABLE 8: NUMBER OF POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	FAMILY HISTORY OF HEARING LOSS PRIOR TO AGE SIX						
	Total All Students	No Parents No Siblings With Loss	At Least One Parent No Siblings With Loss	At Least One Parent & 1 or More Siblings With Loss	1 Sibling and No Parents With Loss	2 or More Siblings No Parents With Loss	Unable to Classify
Total All Causes	15,008	5,717	281	91	1,208	383	7,328
Total Specified Causes	7,457	3,926	163	44	638	162	2,524
Meningitis	2,017	1,218	29	2	106	15	647
Mumps	351	154	3	4	31	8	151
Measles	1,114	548	21	7	135	35	368
Otitis Media	927	407	18	5	73	24	400
Fever	628	344	13	6	58	16	191
Trauma	420	215	10	4	40	5	146
All Other Specified Post-natal Causes	2,000	1,040	69	16	195	59	621
Onset of Loss After Birth But Cause Not Determined	2,043	962	46	23	272	99	641
Onset of Loss After Birth But Cause Not Reported	5,508	829	72	24	298	122	4,163

TABLE 9: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE OF DISCOVERY: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	AGE OF DISCOVERY												
	All Ages Hearing Loss Discovered	At Birth	Under 1 Year	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years & Over	Data Not Reported
Total All Causes	28,402	361	3,600	4,408	3,665	1,867	935	865	653	242	113	167	11,526
Total Specified Causes	16,037	219	2,414	2,810	2,244	1,144	571	449	307	125	50	82	5,622
Maternal Rubella	6,077	76	1,073	1,267	989	415	153	59	40	9	5	10	1,981
Trauma To Mother During Pregnancy	253	1	37	52	42	23	10	11	7	2	1	2	65
Medication During Pregnancy	271	8	43	58	40	28	13	10	5	3	–	1	62
Prematurity	2,207	19	254	339	345	195	128	101	67	31	14	21	693
Rh Incompatibility	1,402	16	196	233	197	119	68	46	38	20	5	7	457
Heredity	3,073	39	441	441	281	145	88	80	68	23	12	12	1,443
Other Complications of Pregnancy	994	12	141	183	144	97	50	61	31	18	5	8	244
Trauma During Delivery	916	16	127	125	118	82	39	50	29	12	8	13	297
All Other Specified Causes	844	32	102	112	88	40	22	31	22	7	–	8	380
Onset of Loss At Birth But Cause Not Determined	7,741	97	911	1,253	1,097	518	246	260	192	51	29	38	3,049
Onset of Loss At Birth But Cause Not Reported	4,624	45	275	345	324	205	118	156	154	66	34	47	2,855

TABLE 10: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY AGE OF DISCOVERY: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	AGE OF DISCOVERY											
	All Ages Hearing Loss Discovered	Under 1 Year	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years & Over	No Data Reported
Total All Causes	15,008	1,160	2,011	1,760	1,096	619	768	734	434	279	560	5,587
Total Specified Causes	7,457	883	1,415	1,166	737	413	489	438	256	150	304	1,206
Meningitis	2,017	344	470	371	189	117	79	50	17	15	19	346
Mumps	351	15	25	35	32	26	34	38	32	18	40	56
Measles	1,114	100	198	163	123	64	95	72	44	23	51	181
Otitis Media	927	44	96	91	82	42	86	142	86	49	95	114
Fever	628	60	134	126	66	35	47	24	12	7	18	99
Trauma	420	36	60	67	57	29	34	31	14	11	17	64
All Other Specified Causes	2,000	284	432	313	188	100	114	81	51	29	64	344
Onset of Loss After Birth But Cause Not Determined	2,043	144	332	333	198	117	131	110	76	45	98	459
Onset of Loss After Birth But Cause Not Reported	5,508	133	264	261	161	89	148	186	102	84	158	3,922

TABLE 11: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY HEARING THRESHOLD LEVELS[1]: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	HEARING THRESHOLD LEVELS						
	All Hearing Threshold Levels (ISO)[1]	Under 45dB	45dB to 64dB	65dB to 84dB	85dB to 98dB	99dB & Above	Unknown
Total All Causes	28,402	1,378	2,972	5,840	5,723	6,318	6,171
Total Specified Causes	16,037	669	1,725	3,521	3,226	3,366	3,530
Maternal Rubella	6,077	128	410	1,408	1,235	1,265	1,631
Trauma To Mother During Pregnancy	253	22	30	34	63	54	50
Medication During Pregnancy	271	14	36	54	51	56	60
Prematurity	2,207	125	347	564	440	374	357
Rh Incompatibility	1,402	52	187	386	329	221	227
Heredity	3,073	133	286	509	643	858	644
Other Complications of Pregnancy	994	57	165	215	169	177	211
Trauma During Delivery	916	72	131	203	165	184	161
All Other Specified Causes	844	66	133	148	131	177	189
Onset of Loss At Birth But Cause Not Determined	7,741	328	712	1,433	1,647	2,040	1,581
Onset of Loss At Birth But Cause Not Reported	4,624	381	535	886	850	912	1,060

[1] Average hearing threshold in the better ear computed at 500, 1000, 2000 cycles per second.

TABLE 12: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY HEARING THRESHOLD LEVELS[1]: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	HEARING THRESHOLD LEVELS						
	All Hearing Threshold Levels (ISO)[1]	Under 45dB	45dB to 64dB	65dB to 84dB	85dB to 98dB	99dB & Above	Unknown
Total All Causes	15,008	2,430	1,609	2,480	2,373	2,844	3,272
Total Specified Causes	7,457	1,296	720	1,169	1,150	1,623	1,499
Meningitis	2,017	66	99	281	307	707	557
Mumps	351	136	39	46	37	42	51
Measles	1,114	234	155	188	206	182	149
Otitis Media	927	442	111	90	63	73	148
Fever	628	81	77	122	93	107	148
Trauma	420	79	54	74	62	71	80
All Other Specified Post-natal Causes	2,000	258	185	368	382	441	366
Onset of Loss After Birth But Cause Not Determined	2,043	260	263	382	363	387	388
Onset of Loss After Birth But Cause Not Reported	5,508	874	626	929	860	834	1,385

[1] Average hearing threshold in the better ear computed at 500, 1000, 2000 cycles per second.

TABLE 13: NUMBER OF REPORTED PRE-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY TYPE OF EDUCATIONAL PROGRAM: UNITED STATES, 1970-71 SCHOOL YEAR.

Pre-natal Causes of Hearing Loss	TYPE OF EDUCATIONAL PROGRAM							
	All Types of Educational Programs	Residential School for Deaf	Classes for Hearing Impaired	Day School For Deaf	Program For Multiply Handicapped	Itinerant & Part Time Special Educational Services	Speech & Hearing Clinics	Other
Total All Pre-Natal Causes	28,402	12,985	9,587	1,877	485	2,720	541	207
Total Specified Causes	16,037	6,735	6,057	1,159	372	1,298	318	98
Maternal Rubella	6,077	2,085	2,757	612	163	310	136	14
Trauma To Mother During Pregnancy	253	81	116	18	12	16	7	3
Medication During Pregnancy	271	89	114	21	4	29	13	1
Prematurity	2,207	841	867	158	67	218	42	14
Rh Incompatibility	1,402	644	468	79	22	150	33	6
Heredity	3,073	1,827	775	92	22	294	36	27
Other Complications of Pregnancy	994	285	453	79	36	106	31	4
Trauma During Delivery	916	400	309	58	32	94	13	10
All Other Specified Causes	844	483	198	42	14	81	7	19
Onset of Loss At Birth But Cause Not Determined	7,741	4,142	2,105	462	58	754	176	44
Onset of Loss At Birth But Cause Not Reported	4,624	2,108	1,425	256	55	668	47	65

TABLE 14: NUMBER OF REPORTED POST-NATAL CAUSES OF HEARING LOSS OF STUDENTS ENROLLED IN PARTICIPATING SPECIAL EDUCATIONAL PROGRAMS FOR THE HEARING IMPAIRED BY TYPE OF EDUCATIONAL PROGRAM: UNITED STATES, 1970-71 SCHOOL YEAR.

Post-natal Causes of Hearing Loss	TYPE OF EDUCATIONAL PROGRAM							
	All Types of Educational Programs	Residential School for Deaf	Classes for Hearing Impaired	Day School for Deaf	Program for Multiply Handicapped	Itinerant & Part Time Special Educational Services	Speech & Hearing Clinics	Other
Total All Causes	15,008	6,382	3,998	1,201	245	2,036	132	1,014
Total Specified Causes	7,457	3,121	2,115	413	147	1,107	97	457
Meningitis	2,017	1,041	616	150	19	140	37	14
Mumps	351	77	100	13	18	92	1	50
Measles	1,114	433	306	47	42	198	5	83
Otitis Media	927	154	245	28	30	280	24	166
Fever	628	222	244	30	8	104	14	6
Trauma	420	164	124	23	9	65	2	33
All Other Specified Post-natal Causes	2,000	1,030	480	122	21	228	14	105
Onset of Loss After Birth But Cause Not Determined	2,043	1,086	466	101	22	267	15	86
Onset of Loss After Birth But Cause Not Reported	5,508	2,175	1,417	687	76	662	20	471

APPENDICES

Appendix I — Description of the Annual Survey of Hearing Impaired Children and Youth

Appendix II — Basic Data Form Used in the Annual Survey for the 1970-71 School Year

Appendix III — Preschool Data Form Used in the Annual Survey for the 1970-71 School Year

Appendix IV — Programs Participating in the Annual Survey of Hearing Impaired Children and Youth, 1970-71 School Year

APPENDIX I

The Annual Survey of Hearing Impaired Children and Youth

BACKGROUND AND PURPOSE

The Annual Survey of Hearing Impaired Children and Youth began its activities in May 1968. The program is established as a permanent research organization to collect, process and disseminate data on hearing impaired individuals through college age in the United States. The need for such information has been of prime concern to educators, audiologists, legislators, psychologists and others.

The Division of Research, Bureau of Education for the Handicapped, Office of Education, Department of Health, Education, and Welfare initiated the Annual Survey and the National Institute of Education now provides the major share of its funding. Two preceding years of pilot and developmental work in a five state area determined the operational feasibility of the program. The Annual Survey is conducted by the Office of Demographic Studies of Gallaudet College.

The long range goal of the Annual Survey is to collect data on the entire hearing impaired population through college age in the United States. For operational reasons the hearing impaired population has been divided into three groups:

GROUP A: Hearing impaired individuals who are receiving special educational services related to their hearing loss

GROUP B: Individuals who have been diagnosed as being hearing impaired but who are not receiving any special educational services

GROUP C: Individuals in the general population who, in fact, are hearing impaired but their hearing loss has not been diagnosed at a given point in time.

To this point in its work, the Annual Survey has devoted its resources almost totally to collecting and disseminating information on Group A.

The primary interest of this national program is in those kinds of data that can serve to improve and expand the educational opportunities available to hearing impaired individuals. The program encourages the use of its data by administrators, researchers, and other professionals providing services to the hearing impaired, as well as by any individual or group devoted to improving the results of special education for hearing impaired people.

POLICIES

In its attempt to provide useful information to those interested in hearing impaired children and youth, the Annual Survey has the benefit of the guidance and advice of its National Advisory Committee. Among its members are hearing and deaf individuals, administrators, researchers, teachers, and specialists from other areas within the field of hearing impairment. Every attempt is made to maintain a wide diversity of interests and competencies, as well as geographic representation, among its members. On questions of a technical nature, consultants from specialized fields are utilized as particular needs arise.

While permanent and national in scope, the Annual Survey does not aim at replacing or absorbing the work of other programs at the state or local level which are devoted to the collection and dissemination of information on hearing impaired children and youth. Rather, it seeks to facilitate their work through cooperation whenever this is feasible. Nor does the Annual Survey view itself as the center for

all types of research in this field. It focuses its activities on collecting and disseminating limited kinds of information on selected topics. It seeks to make available to outside researchers the vast amount of data it possesses and any special services it is feasible to render to them.

One restriction which is observed by the Survey is that no data will be released which permits the identification of an individual student or cooperating program. Exception to this only occurs where a written release is obtained from the program supplying the data Otherwise, independent researchers using the data of the Annual Survey have access only to summary statistics or coded information.

Since the Annual Survey attempts to promote the use of its data by those whose judgments and decisions will have a direct or indirect bearing on the education of hearing impaired individuals, it recognizes a responsibility to devote a part of its resources to the evaluation of the quality of the data collected and disseminated. This is particularly important because it seeks to establish national norms on the basic characteristics of hearing impaired children and youth. Thus, in its dissemination of information, the Annual Survey makes every effort to properly qualify its data and indicate any limitation associated with it.

The Annual Survey seeks to avoid associating itself with any established position relating to controversial issues within the field of educating hearing impaired individuals. Thus, it does not interpret its own data. Rather, it seeks to facilitate the use of its data by reputable individuals or organizations that may themselves wish to draw policy implications or test research hypotheses that are related to these issues.

DATA COLLECTION

During the first year of the Survey, the 1968-69 school year, data collection activities were directed towards all schools for the deaf and a representative sample (15 percent) of all special classes. In addition, records on students who were receiving itinerant services were obtained in total from two states and in part from several states. In all 25,363 individual records were collected.

Each year the Survey has steadily increased its coverage of the population. Over 550 reporting sources with approximately 41,000 students enrolled in their programs cooperated with the Annual Survey for the 1970-71 school year. During the 1971-72 school year, data on approximately 42,000 hearing impaired students from about 640 reporting sources were obtained.

PROGRAM SERVICES AND PUBLICATION OF THE DATA

The program is accumulating a large volume of statistical data. The processing and dissemination of these data hold wide implications and potential benefits for educational, audiological, medical, psychological, legislative and other services to the hearing impaired. Towards the goal of fully utilizing the data, the program will make data available to independent investigators for research purposes, including masters' theses, doctoral dissertations, institutional level research programs, private studies, etc. Competent researchers are encouraged to propose detailed analyses of the data to further increase its usefulness.

The Annual Survey has conducted two National Academic Achievement Testing Programs, the first in the Spring of 1969 and the second in the Spring of 1971. The Annual Survey supplied testing materials and scoring services free of charge to participating programs. Data collected from these special studies have been published and continue to be analyzed. A reliability study also was conducted in conjunction with the most recent Achievement Testing Program and this evaluation study will help to determine the reliability of an achievement test designed for hearing students when used by hearing impaired students.

The Survey Office also provides each participating school or program with tabulations of the characteristics of their own students. The participating programs may obtain a set of punch cards containing the information submitted on each of their students. Further, the Annual Survey Office is available to provide consultation services to particular schools or school systems that are concerned with gathering and processing data on their students.

Participation in the Survey has led many of the programs to examine their current forms and record-keeping procedures. This led to requests that the Survey develop a uniform record form to keep student information for use in schools and classes throughout the country. Such a form was developed and used on a trial basis by a few schools during the 1970-71 school year. On the basis of this experience, the form was revised and distributed for use during the 1971-72 school year. Indications are that approximately half of the educational programs for the hearing impaired in the United States were using the form during the 1971-72 school year.

The Annual Survey also has conducted a survey of the fifty states. The state departments of either Education or Health were contacted for information

on their particular state. Among the types of information sought were: (1) description of services available to hearing impaired children and youth, (2) types of screening programs now in existence, (3) the referral system for those found to have a hearing loss, (4) the number of students receiving special services, and (5) the type of legislation relating to hearing impaired students.

The Annual Survey reports much of the data in a series of publications. A listing of the publications to date appears on the inside back cover of this report.

FUTURE PLANS

During the early stages of the program, the Annual Survey devoted most of its resources to gathering basic demographic information on hearing impaired students, and to extending its coverage of these students to its current level. It is now in the process of formulating future plans, with the intention of beginning to collect information on selected topics of special interest to those in the field.

It is anticipated that the Survey will begin to collect data on the institutions themselves and the auxiliary services available to the students at the schools. Sample studies are planned in which the families of the hearing impaired students will supply information to the Survey.

Meanwhile, the Annual Survey will continue its efforts to produce an achievement test appropriate for hearing impaired students. Also being considered is the feasibility of developing measures of student performance in other areas beside academic achievement.

The initial success of the Annual Survey can be measured only in terms of the levels of participation and interest expressed by many individuals. The ultimate success will be measured not in terms of volume of data that will be collected and published, but in terms of its contributions to improving educational and other opportunities for hearing impaired children and youth.

APPENDIX II

OFFICE OF DEMOGRAPHIC STUDIES
GALLAUDET COLLEGE, WASHINGTON, D.C.

BASIC DATA FORM FOR STUDENTS AGE SIX AND OVER

(This form is to be used for children who were born in 1964 or earlier)

ACHIC 2 (71)

ANNUAL SURVEY OF HEARING IMPAIRED CHILDREN — 1970-71 School Year

CONFIDENTIAL: All information which would permit identification of any individual or institution will be held strictly confidential and will be used only by persons engaged in the survey for preparing statistical summaries. The data will not be disclosed to others for any other purpose.

Name of Reporting Source: _____

I. GENERAL INFORMATION

A. 1. Name of Student or Code Number _____ (Last) _____ (First) _____ (Middle) Date of Birth _____ (Mo., Day, Yr.) Sex ☐ M ☐ F

2. Residence _____ (City) _____ (County) _____ (State)

B. 1. Present School or Agency _____ (Name)

2. Location _____ (Number and Street) _____ (City) _____ (County) _____ (State & ZIP Code)

II. EDUCATIONAL PROGRAM

A. 1. For students enrolled **fulltime** in a special class or school, check below:
☐ School for the Deaf ☐ Classes for Hearing Impaired
☐ School for Multiply Handicapped ☐ Classes for Multiply Handicapped

2. For students who do not attend a special school or class on a fulltime basis, enter type of program below:
Regular Classes _____ hours per week; **plus** itinerant services _____ hours per week.
Regular Classes _____ hours per week; **plus** other special educational services _____ hours per week.
Special Classes _____ hours per week
Other (specify type and hours per week): _____

B. 1. Type of school or agency: ☐ Public ☐ Private

2. Type of student: ☐ Residential ☐ Day

III. EDUCATIONAL HISTORY

A. Date first enrolled in **this** school: _____

B. Educational history since age six:

1. Total full years attended this school since age six: _____ (Do not include present school year)

2. Attendance at **other** schools since age six. (Do **not** include present school):
Mark all that apply. If none check here ☐
Regular Classes Only- _____ Years
Regular Classes Plus Special Training- _____ Years
Fulltime Classes for Hearing Impaired- _____ Years
Schools for the Deaf- _____ Years
Other- _____ Years

C. Formal education prior to age six: If none check here ☐ If unknown check here ☐

1. Age started _____

2. Type (check all that apply):
☐ Preschool for Hearing ☐ Preschool for Hearing Impaired ☐ Speech and Hearing Clinic
☐ Preschool for Multiply Handicapped ☐ Parent-Child Program ☐ Other (specify) _____

IV. HISTORY OF HEARING LOSS

A. STUDENT HISTORY

1. Probable age at onset of hearing loss: ☐ At Birth _____ Years of Age

2. Age hearing loss discovered: _____ Years _____ Months

3. If onset of loss **at birth**, what was probable cause **(mark all that apply)**? ☐ No Known Cause ☐ Data Not Available
☐ Maternal Rubella ☐ Trauma to Mother ☐ Prematurity ☐ Complications of Pregnancy ☐ Hereditary
☐ Trauma at Birth ☐ Medication During Pregnancy ☐ RH Incompatibility ☐ Other (specify) _____

4. If loss acquired **after birth**, what was probable cause **(mark all that apply)**? ☐ No Known Cause ☐ Data Not Available
☐ Meningitis ☐ Mumps ☐ Measles ☐ Otitis-Media ☐ Trauma ☐ Fever
☐ Other (specify): _____

5. Birth weight, if known: _____ lbs. _____ ozs.

B. FAMILY HISTORY

1. Mother (check one): ☐ Normal hearing before age 6; ☐ Hearing loss before age 6; ☐ Data not available.

2. Father (check one): ☐ Normal hearing before age 6; ☐ Hearing loss before age 6; ☐ Data not available.

3. Siblings **(Indicate number of student's brothers and sisters in each category—If none, write "0"):**
Total number _____; Normal hearing before age 6 _____; Hearing loss before age 6 _____; ☐ Data not available

4. Does student have a twin? ☐ Yes ☐ No **(If YES, complete items 4(a), 4(b), and 4(c) below):**
(a) Sex of twin: ☐ M ☐ F
(b) Is twin enrolled in this school? ☐ Yes ☐ No
(c) Does twin have a hearing impairment? ☐ Yes ☐ No

5. Is there any family history of deafness other than parents, brothers, or sisters? ☐ Yes ☐ No If YES, who? _____

6. Are parents related other than by marriage? ☐ Yes ☐ No If YES, in what way? _____

V. AUDIOLOGICAL FINDINGS

A. ☐ Not Tested ☐ Unable To Test ☐ Tested, But Results Not Available

B. ☐ Tested **(Record Results Below):** [NOTE: If sound field examination, check here ☐. Record results in spaces provided for right ear.]

1. Standard used for testing: ☐ ISO ☐ ASA

2.

	RIGHT EAR								LEFT EAR							
Frequency	125	250	500	1000	2000	4000	6000	8000	125	250	500	1000	2000	4000	6000	8000
Air Conduction																
Bone Conduction																

C. UNAIDED SPEECH THRESHOLD

1. Test Used: ☐ SAT ☐ SRT ☐ Not Tested

2.

RIGHT EAR						LEFT EAR					
0-15dB	16-29dB	30-44dB	45-59dB	60-79dB	80dB & over	0-15dB	16-29dB	30-44dB	45-59dB	60-79dB	80dB & over

D. EXAMINER IDENTIFICATION

Name of clinic or place conducting audiological examination

_____ Date _____

Address _____
(Number and Street) (City) (State & ZIP Code)

Profession of Examiner: ☐ Audiologist ☐ Otologist ☐ Other M.D. ☐ Audiometrist ☐ Nurse ☐ Teacher

Other (specify) _____

VI. INTELLIGENCE TEST

A. ☐ Not Tested ☐ Unable To Test ☐ Tested, But Results Not Available

B. ☐ Tested (Indicate results of most recent intelligence test):

Description of Test		I.Q. Scores		Date Tested
Name	Level	Verbal Score	Nonverbal Score	Month, Yr.

VII. ADDITIONAL HANDICAPPING CONDITIONS

Check all educationally significant handicapping conditions: If none, check here ☐

☐ Epilepsy
☐ Cleft Lip
☐ Cleft Palate
☐ Severe Visual
☐ Mental Retardation
☐ Cerebral Palsy
☐ Perceptual-Motor Disorders
☐ Emotional or Behavioral Problems
☐ Heart Disorders

☐ Other (describe) _____

COMMENTS:

APPENDIX III

OFFICE OF DEMOGRAPHIC STUDIES
GALLAUDET COLLEGE, WASHINGTON, D.C.

BASIC DATA FORM FOR CHILDREN UNDER SIX

(This form is to be used for children who were born in 1965 or later.)

ACHIC 4 (71)

ANNUAL SURVEY OF HEARING IMPAIRED CHILDREN — 1970-71 School Year

CONFIDENTIAL: All information which would permit identification of any individual or institution will be held strictly confidential and will be used only by persons engaged in the survey for preparing statistical summaries. The data will not be disclosed to others for any other purpose.

Name of Reporting Source:

I. GENERAL INFORMATION

A. 1. Name of Student or Code Number _____ (Last) _____ (First) _____ (Middle) Date of Birth _____ (Mo., Day, Yr.) Sex ☐ M ☐ F

2. Residence _____ (City) _____ (County) _____ (State)

B. 1. Present School or Agency _____ (Name)

2. Location _____ (Number and Street) _____ (City) _____ (County) _____ (State & ZIP Code)

II. EDUCATIONAL PROGRAM

A. TYPE OF SCHOOL OR AGENCY

1. ☐ School for Hearing ☐ Residential School for Deaf ☐ School for Multiply Handicapped
☐ Classes for Hearing Impaired ☐ Day School for Deaf ☐ Speech and Hearing Clinic
☐ Other (specify): _____

2. Is School or Agency: ☐ Public ☐ Private

3. Type of Student: ☐ Residential ☐ Day

B. TYPE OF PROGRAM

1. Indicate number of hours per week the child is seen: _____ Hours Per Week

2. Is the child seen: ☐ Individually ☐ Group or ☐ Both

3. Total time child has been enrolled in this school or agency: _____ Years _____ Months

4. Parent Training:
(a) Parents have completed or are enrolled in a special parent program: ☐ Yes ☐ No
(b) Parents have completed or are participating in a correspondence course: ☐ Yes ☐ No

III. EDUCATIONAL HISTORY

A. Prior to the present program, has the child received other special educational training: ☐ Yes ☐ No

1. If YES, age started first program: _____ Years _____ Months

2. Type (include all previous programs): (a) _____ (b) _____ (c) _____

3. Total time enrolled in all previous programs: _____ Years _____ Months

IV. HISTORY OF HEARING LOSS

A. STUDENT HISTORY

1. Probable age at onset of hearing loss: ☐ At Birth _____ Years of Age

2. Age hearing loss discovered: _____ Years _____ Months

3. If onset of loss **at birth**, what was probable cause **(mark all that apply)**? ☐ No Known Cause ☐ Data Not Available
☐ Maternal Rubella ☐ Trauma to Mother ☐ Prematurity ☐ Complications of Pregnancy ☐ Hereditary
☐ Trauma at Birth ☐ Medication During Pregnancy ☐ RH Incompatibility ☐ Other (specify) _____

4. If loss acquired **after birth**, what was probable cause **(mark all that apply)**? ☐ No Known Cause ☐ Data Not Available
☐ Meningitis ☐ Mumps ☐ Measles ☐ Otitis-Media ☐ Trauma ☐ Fever
☐ Other (specify): _____

5. Birth weight, if known: _____ lbs. _____ ozs.

B. FAMILY HISTORY

1. Mother (check one): ☐ Normal hearing before age 6; ☐ Hearing loss before age 6; ☐ Data not available.

2. Father (check one): ☐ Normal hearing before age 6; ☐ Hearing loss before age 6; ☐ Data not available.

3. Siblings **(Indicate number of student's brothers and sisters in each category—If none, write "0")**:
Total number _____; Normal hearing before age 6 _____; Hearing loss before age 6 _____; ☐ Data not available

4. Does student have a twin? ☐ Yes ☐ No **(If YES, complete items 4(a), 4(b), and 4(c) below)**:
(a) Sex of twin: ☐ M ☐ F
(b) Is twin enrolled in this school? ☐ Yes ☐ No
(c) Does twin have a hearing impairment? ☐ Yes ☐ No

5. Is there any family history of deafness other than parents, brothers, or sisters? ☐ Yes ☐ No If YES, who? _____

6. Are parents related other than by marriage? ☐ Yes ☐ No If YES, in what way? _____

V. AUDIOLOGICAL FINDINGS

A. ☐ Not Tested ☐ Unable To Test ☐ Tested, But Results Not Available

B. ☐ Tested **(Record Results Below):** [NOTE: If sound field examination, check here ☐. Record results in spaces provided for right ear.]

1. Standard used for testing: ☐ ISO ☐ ASA

2.

	RIGHT EAR								LEFT EAR							
Frequency	125	250	500	1000	2000	4000	6000	8000	125	250	500	1000	2000	4000	6000	8000
Air Conduction																
Bone Conduction																

C. UNAIDED SPEECH THRESHOLD

1. Test Used: ☐ SAT ☐ SRT ☐ Not Tested

2.

RIGHT EAR						LEFT EAR					
0-15dB	16-29dB	30-44dB	45-59dB	60-79dB	80dB & over	0-15dB	16-29dB	30-44dB	45-59dB	60-79dB	80dB & over

D. EXAMINER IDENTIFICATION

Name of clinic or place conducting audiological examination

_____ Date _____

Address _____
(Number and Street) (City) (State & ZIP Code)

Profession of Examiner: ☐ Audiologist ☐ Otologist ☐ Other M.D. ☐ Audiometrist ☐ Nurse ☐ Teacher

Other (specify) _____

VI. INTELLIGENCE TEST

A. ☐ Not Tested ☐ Unable To Test ☐ Tested, But Results Not Available

B. ☐ Tested (Indicate results of most recent intelligence test):

Description of Test		I.Q. Scores		Date Tested
Name	Level	Verbal Score	Nonverbal Score	Month, Yr.

VII. ADDITIONAL HANDICAPPING CONDITIONS

Check all educationally significant handicapping conditions: If none, check here ☐

☐ Epilepsy
☐ Cleft Lip
☐ Cleft Palate
☐ Severe Visual
☐ Mental Retardation
☐ Cerebral Palsy
☐ Perceptual-Motor Disorders
☐ Emotional or Behavioral Problems
☐ Heart Disorders

☐ Other (describe) _____

VIII. HEARING AID USE

A. Does Student Use a Personal Aid? ☐ Yes ☐ No
If YES, is aid: ☐ Monaural ☐ Binaural ☐ Y Cord

B. Speech Awareness Threshold With Aid is _____ dB.

C. Speech Reception Threshold With Aid is _____ dB.

COMMENTS:

APPENDIX IV

Participants in the Annual Survey of Hearing Impaired Children and Youth 1970-71 School Year

ALABAMA
- Alabama Institute for the Deaf & the Blind
- Birmingham Public Schools
- Blossomwood Elementary School
- Children's Center of Montgomery, Inc.
- Etowah County Center for Aurally Handicapped
- Holt Elementary School
- Huntsville Rehabilitation Center
- Lewis-Slossfield Speech & Hearing Center
- Mobile County Public Schools
- Mobile Preschool for the Deaf, Inc.
- Rockwood Speech & Hearing Class
- Tuscaloosa County Preschool Deaf Class — University of Alabama

ALASKA
- Alaska Treatment Center for Crippled Children & Adults, Inc.
- Anchorage Borough School District

ARIZONA
- Arizona State School for the Deaf & the Blind
- Samuel Gompers Memorial Rehabilitation Center, Inc.
- Phoenix Day School for the Deaf
- Phoenix Elementary School District #1

ARKANSAS
- Arkansas Children's Handicapped Center-Hearing & Speech Clinic
- Jenkins Memorial Children's Center

CALIFORNIA
- Alameda County Hearing Impaired Program
- Alhambra City School District
- Alum Rock Union Elementary School District
- Anaheim Union High School District
- Bellflower Unified School District
- Mary E. Bennett School for the Deaf
- Butte County Schools
- California School for the Blind, Deaf-Blind Department
- California School for the Deaf, Berkeley
- California School for the Deaf, Riverside
- Cedarcreek School for the Deaf
- Centralia School District
- Ceres Unified School District
- Chula Vista City School District
- Covina Valley Unified School District
- Cutler-Orosi Unified School District
- Downey Senior High School
- East San Gabriel Valley School for Multi-Handicapped Children
- Escondido Union School District
- Fremont Unified School District
- Fresno City Unified School District
- Fresno State College Class for Multi-Handicapped Deaf
- Garden Grove Unified School District
- Goleta Union School District
- Hayward Unified School District
- Kern County Schools
- La Mesa — Spring Valley School District
- Lancaster Elementary School District
- Little Lake City School District
- Lompoc Unified School District
- Long Beach Unified School District
- Marin County Schools
- Marlton Elementary School
- Montebello Unified School District
- Monterey County Schools
- Mt. Diablo Unified School District
- Napa Valley Unified School District
- Norwalk-La Mirada Unified School District
- Oakland City Unified School District
- Orange Unified School District
- Orcutt Union School District
- Pasadena Unified School District

Placer County Special Schools
Pomona Unified School District
Richmond Unified School District
Riverside Unified School District
Sacramento City Unified School District
San Bernardino County Schools
San Diego Unified School District
San Francisco Speech & Hearing Center
San Jose City Unified School District
San Juan Unified School District
San Mateo County Classes for the Deaf
San Mateo Union High School District
Santa Ana Unified School District
Santa Clara Unified School District
Santa Cruz County Itinerant Program for Hearing Impaired
Santa Rosa City School District
Simi Valley Unified School District
Solano County Aurally Handicapped Classes
South Junior High School
Southwest School for the Deaf
Stockton Unified School District
Sunnyvale Elementary School District
Sutter County Schools
Tehama County Public Schools
Tulare County Schools
Union School District
Ventura Unified School District

COLORADO

Boulder Valley Public Schools
Children's Hospital — Audiology & Speech Pathology Department
Colorado School for the Deaf & the Blind
Colorado Hearing & Speech Center
Jefferson County Public Schools
John Evans School
Meadow Elementary School
Poudre R-1 School District
University of Northern Colorado — Special Education Laboratory School

CONNECTICUT

American School for the Deaf
Capitol Region Education Council
Easter Seal Goodwill Industries Rehabilitation Center
East Hartford Board of Education
Fairfield Public Schools
Green Acres School
Hamden-New Haven Cooperative Educational Center
Hartford Board of Education
Hazardville Memorial School
Kings Highway Elementary School
Magrath School
Mystic Oral School for the Deaf
Watertown Public Schools
West Haven Department of Special Education

DELAWARE

Margaret S. Sterck School for the Hearing Impaired

DISTRICT OF COLUMBIA

Capitol Region Model Secondary School for the Deaf
Grant School
Kendall School for the Deaf
Public Schools of the District of Columbia — Speech & Hearing Center

FLORIDA

Brevard County Schools — Exceptional Child Education
Dade County Public Schools
Easter Seal Rehabilitation Center
Escambia County Schools
Florida School for the Deaf & the Blind
Hillsborough County Public Schools
Leon County Program for Hearing Impaired Children
Multi-County Hearing Impaired Program — Lee County Board of Education
Okaloosa County Schools
Palm Beach County Schools-Exceptional Child Education
Pinellas County Schools-Exceptional Child Education
Robert McCord Oral School
Rock Lake Elementary School
Speech & Hearing Center, Inc.
Tampa Oral School for the Deaf, Inc.
Volusia County Schools

GEORGIA

Atlanta Public Schools
Atlanta Speech School, Inc.
Cobb County Board of Education — Hearing Department
The Davison School, Inc.
DeKalb County Program for Exceptional Children
Lawton B. Evans School
Georgia School for the Deaf
Houston Speech School
Savannah Speech & Hearing Center

HAWAII

Hawaii School for the Deaf & the Blind
Hawaii Department of Education

IDAHO

Idaho School for the Deaf & the Blind
Idaho State University — Speech & Hearing Center

ILLINOIS

Bell Elementary School
Black Hawk Hearing Handicapped Program
Champaign Community Schools
Chicago Vocational High School
Dixon State School
Elim Christian School for the Exceptional Child
Ericson School
Nathaniel Green School
Harrison High School
Illinois School for the Deaf
Illinois State University — Special Education Laboratory School
The Institute for Hearing & Speech
Jamieson School
Macon County Special Education District
Marquette Elementary School
Morrill Elementary School
Northern Suburban Special Education District
North-Northwest Programs for Hearing Impaired Children
Northern Illinois University-Ray Graham School
Northwestern Illinois Association
Perry School
Quincy Public Schools
Ray School
Reinberg School
St. Joseph's Hospital — Speech & Hearing Clinic
Scammon School
Shields Elementary School
South Metropolitan Association for Low Incidence Handicapped
Southwest Regional Program for Hearing Impaired
Special Education District of Lake County
Springfield Public Schools
James Ward Elementary School
West Suburban Association for the Hearing Handicapped
Williamson County Special Education District

INDIANA

Ball State University — Special Education Department
Central Avenue School
East Chicago Day Class for the Deaf
Glenwood Elementary School
Hammond Public Schools
Hearing & Speech Center of St. Joseph's County, Inc.
Indiana School for the Deaf
Indiana University Medical Center
Marion Community Schools
Muncie Community Schools
New Albany — Floyd County Public Schools
South Bend Community School Corporation
Trade Winds Rehabilitation Center, Inc.

IOWA

Black Hawk-Buchanan County Board of Education
Cedar Rapids Community Schools
Dubuque County Schools
Hope Haven School
Iowa School for the Deaf
Smouse Opportunity School
Wapello County School System
Wilson School — Oral Deaf Department

KANSAS

Hays Unified School District
Institute of Logopedics, Inc.
Kansas School for the Deaf
Lawrence Unified School District #497
Mark Twain Elementary School
Unified School District #305
Unified School District #431
University of Kansas Medical Center — Hearing & Speech Department
Wichita Public Schools

KENTUCKY

Kentucky School for the Deaf
Lexington Deaf Oral School
Louisville Independent School District
West Kentucky Easter Seal Center for Crippled Children & Adults

LOUISIANA

Acadia Parish School Board
Jefferson Parish School Board
Lafayette Parish School Board
Louisiana School for the Deaf
Speech & Hearing Center of Southwest Louisiana, Inc.
State School for the Deaf-Southern University Branch
Sunset Acres Deaf Oral Classes

MAINE

Governor Baxter State School for the Deaf
Northeast Hearing & Speech Center, Inc.

MARYLAND

William S. Baer School #301
Baltimore County Department of Special Education
Board of Education of Harford County
Gateway Preschool
Maryland School for the Deaf
Montgomery County Public Schools
Pikesville Junior High School
Prince George's County Public Schools
Special Education Center, Hagerstown

MASSACHUSETTS

Mary Altavesta School
Belmont Public Schools
Beverly School for the Deaf
Boston School for the Deaf
Children's Hospital Medical Center — Sarah Fuller Foundation
Clarke School for the Deaf
Concord Public Schools
Franklin County Public Hospital — Communications Disorders Clinic
Habilitation Center for the Preschool Hard-of-Hearing & Deaf Children, Canton
Horatio A. Kempton School
Lawrence Primary Program for the Deaf
Leominster Day Classes for the Hearing Impaired
Lowell Preschool for the Deaf
Perkins School for the Blind
Reading Day Class for Deaf-Killam School
Willie Ross School for the Deaf
Springfield Day Classes for the Deaf
Thayer-Lindsley Nursery
Waltham Public Schools
Worcester Day Classes for the Deaf

MICHIGAN

Allen Park Public Schools
Battle Creek Public Schools
Brighton Public Schools
Constantine Day School for Deaf & Hard of Hearing
Delta-Schoolcraft Intermediate School District
Detroit Day School for Deaf
Douglas Elementary School
Durant-Tuuri-Mott School
Handley School
Holland Public Schools
Ida Public Schools
Jackson Public Schools
Kalamazoo Public Schools
Lakeview Public Schools
Lansing School District
Lapeer State Home & Training School
Lutheran School for the Deaf
Michigan School for the Blind
Michigan School for the Deaf
Michigan State University Speech & Hearing Clinic
Muskegon Public Schools
Negaunee Public Schools
Oakland County Schools
Port Huron Area School District
Redford Union Schools
Shawnee Park Schools
Tecumseh Public Schools
Traverse City Public Schools
Tri-County Preschool
University of Michigan Speech Clinic
Utica Community Schools
Warren Consolidated Schools
Wyoming Preschool for the Physically Handicapped

MINNESOTA

Anoka Hennepin School District #11
Austin Public Schools
Duluth Public Schools
Lutheran High School
Minneapolis Public Schools
Minnesota School for the Deaf
St. Paul Area Program for Impaired Hearing
St. Paul Area Technical Vocational Institute

MISSISSIPPI

Mississippi School for the Deaf
Tupelo Regional Rehabilitation Center

MISSOURI

Central Institute for the Deaf
Delaware Elementary School
Gallaudet School for the Deaf
Greater Kansas City Hearing & Speech Center
Missouri School for the Deaf
Neosho School District R #5
St. Louis County Special School District for the Handicapped
St. Louis University Speech & Hearing Clinic
School District of Kansas City
School District of St. Joseph

MONTANA

Montana State School for the Deaf & the Blind
University of Montana Speech & Hearing Clinic

NEBRASKA

Nebraska School for the Deaf
Omaha Hearing School for Children, Inc.
Omaha Public Schools
Prescott Elementary School

NEVADA

Ruby Thomas Elementary School
Washoe County School District

NEW HAMPSHIRE

Crotched Mountain School for the Deaf
Easter Seal Rehabilitation Center of Greater Manchester
Portsmouth Rehabilitation Center

NEW JERSEY

American Institute for Mental Studies
Avon School
Bruce Street School
Cumberland County Public Schools
Douglas College Hearing & Speech Center
Hackensack Program for the Deaf
Helmbold Education Center
Hunterdon Medical Center — Preschool for Auditorally Impaired
Marie H. Katzenbach School for the Deaf
The Midland School
Millburn Avenue School
Neptune Township Schools
Newark State College — Educational Resource Center
Speech & Hearing Center, Burlington County Memorial Hospital
Summit Speech School
Woodbridge Township Public Schools

NEW YORK

Albany Medical Center Hospital
Board of Cooperative Educational Services, Erie County I
Board of Cooperative Educational Services, Nassau County I
Board of Cooperative Educational Services, Rensselaer County
Board of Cooperative Educational Services, Suffolk County II
Board of Cooperative Educational Services, Suffolk County III
Board of Cooperative Educational Services of Washington, Warren, & Hamilton Counties
Buffalo Public Schools
Caritas Day School for Deaf
Children's Hospital & Rehabilitation Center
Demonstration Home Program — Rochester School for the Deaf
Junior High School 47 — School for the Deaf
Meadowbrook Hospital Speech & Hearing Clinic
Mill Neck Manor Lutheran School for the Deaf
New York Institute for the Education of the Blind
New York School for the Deaf, White Plains
New York State School for the Deaf, Rome
Queens College Speech & Hearing Center
Rochester School for the Deaf
St. Francis de Sales School for the Deaf
St. Joseph's School for the Deaf
St. Mary's School for the Deaf
School for Language & Hearing Impaired Children — Public School 158
Union-Endicott Central School District

NORTH CAROLINA

Central North Carolina School for the Deaf
Charlotte-Mecklenburg Schools
Duke University Medical Center-Acoustic Nursery
Duke University Medical Center-Training Center for Hearing Impaired Children
Eastern North Carolina School for the Deaf
North Carolina School for the Deaf
Path School, Inc.
Wake County Schools

NORTH DAKOTA

Longfellow School
Minot State College Speech & Hearing Clinic
North Dakota School for the Deaf
University of North Dakota Speech & Hearing Clinic

OHIO

Akron Public Schools
Alexander Graham Bell School for Deaf, Cleveland
Alexander Graham Bell School for Deaf, Columbus
Betty Jane Memorial Rehabilitation Center-Oral School
Canton City Public Schools
Clark County Hearing & Speech Center
Elyria City Schools
Hamilton County School Districts-University of Cincinnati
Howard School for the Hearing Impaired
L.B. Kean Elementary School
Kennedy School for the Deaf
Kent Public Schools
Litchfield Rehabilitation Center-Preschool Deaf Nursery
McKinley Elementary School
Mansfield City Schools
Millridge Center for Hearing Impaired Children
Ohio School for the Deaf
St. Rita School for the Deaf
Springfield City Schools
Toledo Public Schools
Trumbull County Hearing Society
Warren City Schools
Youngstown Public Schools
Zanesville Classes for Deaf

OKLAHOMA

Enid Community Speech & Hearing Center
Kerr Junior High School
Oklahoma City Public Schools
Oklahoma School for the Deaf
Oklahoma University Medical Center-School for the Deaf
Shawnee Public Schools

OREGON

Eugene Hearing & Speech Center
Oregon State School for the Deaf
Portland Center for Hearing & Speech, Inc.
Portland Public Schools
Tucker-Maxon Oral School

PENNSYLVANIA

DePaul Institute
Ebensburg State School & Hospital
Elwyn Institute
Erie City School District
Home of the Merciful Saviour for Crippled Children
Willis and Elizabeth Martin School
Pennhurst State School & Hospital
Pennsylvania School for the Deaf
Pennsylvania State Oral School for the Deaf
The Pittsburgh Hearing & Speech Society, Inc.
Western Pennsylvania School for the Deaf
Programs for Speech & Hearing Handicapped:
Adams County Schools
Allegheny County Schools
Armstrong County Schools
Beaver County Schools
Bedford County Schools
Berks County Schools
Blair County Schools
Bradford County Schools
Bucks County Schools
Cambria County Schools
Cameron County Schools
Carbon County Schools
Centre County Schools
Chester County Schools
Clarion County Schools
Clinton County Schools
Crawford County Schools
Cumberland County Schools
Dauphin County Schools
Delaware County Schools
Elk County Schools
Erie County Schools
Fayette County Schools
Franklin County Schools
Fulton County Schools
Huntingdon County Schools
Indiana County Schools
Lancaster County Schools
Lawrence County Schools
Lebanon County Schools
Luzerne County Schools
Lycoming County Schools
McKean County Schools
Mercer County Schools
Mifflin County Schools
Monroe County Schools
Montgomery County Schools
Northampton County Schools
Northumberland County Schools
Pike County Schools
Potter County Schools
Schuylkill County Schools
Snyder County Schools
Somerset County Schools
Sullivan County Schools
Tioga County Schools
Venango County Schools
Warren County Schools
Washington County Schools
Westmoreland County Schools
York County Schools

RHODE ISLAND

Rhode Island School for the Deaf
Rhode Island Hospital

SOUTH CAROLINA

Brennen Hearing Handicapped School
Darlington Area Schools
Estes Elementary School
Florence County School District #3
Hearing & Speech Center, Columbia
Keowee Schools
Charles Lea Center — Speech & Hearing Clinic
Memminger Elementary School
Pee Dee Speech & Hearing Center
South Carolina School for the Deaf & the Blind
United Speech & Hearing Services — Regional Program for the Hearing Impaired

SOUTH DAKOTA

South Dakota School for the Deaf

TENNESSEE

Arlington State Hospital & School
Clover Bottom Hospital & School
East Tennessee State University — Speech & Hearing Clinic
Green Valley Hospital & School
Hamilton County Speech & Hearing Center
Memphis Parents School for Deaf & Aphasic
Memphis Speech & Hearing Center
Metropolitan Nashville Schools — Hearing Impaired Program
Sunnyside Elementary School
Tennessee School for the Deaf
University of Tennessee-Preschool Program for Hearing Impaired
Bill Wilkerson Hearing & Speech Center

TEXAS
- Abilene Independent School District
- Austin Independent School District
- Bexar County School for the Deaf
- Bi-County Day School for the Deaf, Waco
- Callier Hearing & Speech Center
- Cameron-Hidalgo Bi-County Day School for the Deaf
- El Paso County-Wide Day School for the Deaf & Hard of Hearing
- Farias Special Education School
- Grayson County Society for Crippled Children & Adults, Inc.
- Harlandale Independent School District
- Harris County-Wide Day School for the Deaf
- Houston School for Deaf Children
- Houston Speech & Hearing Center
- Lubbock Independent School District
- Midland Independent School District
- Multi-County School for the Deaf, Beaumont
- Nueces-San Patricio Bi-County School for the Deaf
- Pasadena Independent School District
- Port Arthur Independent School District
- Sunshine Cottage School for Deaf Children
- Tarrant County Day School for Deaf
- Texarkana Independent School District
- Texas Christian University Speech & Hearing Clinic
- Texas School for the Deaf
- Wichita Falls Independent School District

UTAH
- Utah Schools for the Deaf & the Blind
- Utah State University-Edith Bowen Laboratory School

VERMONT
- Austine School for the Deaf

VIRGINIA
- Arlington County Public Schools
- Bristol Memorial Hospital Speech & Hearing Center
- Charlottesville Public Schools
- Chesterfield County Public Schools
- Diagnostic, Adjustive & Corrective Center for Learning
- Diagnostic Special Education School of Tidewater Rehabilitation Institute
- Oral School, Richmond
- Virginia School for the Deaf & the Blind
- Virginia State School for the Deaf at Hampton

WASHINGTON
- Bellevue Public Schools
- Bremerton School District
- Edmonds School District #15
- Edna E. Davis School
- Kent Public Schools
- Northshore School District #417
- Seattle Community College — Classes for the Deaf
- Seattle Public Schools
- Shoreline School District #412
- University of Washington — Experimental Education Unit
- Washington State School for the Blind
- Washington State School for the Deaf
- Washington State University Speech & Hearing Clinic
- Yakima School District #7

WEST VIRGINIA
- Kanawha Hearing & Speech Center — Charleston Memorial Hospital
- West Virginia Schools for the Deaf & the Blind

WISCONSIN
- Bartlett School
- Cooper Day School for Deaf
- Green Bay School for the Deaf
- La Crosse Classes for the Hearing Impaired
- Madison Public School System
- Milwaukee Hearing Society, Inc.
- Oshkosh Area Public Schools
- Pleasant Hill School
- St. John's School for the Deaf
- E. H. Wadewitz School
- Wausau Day School for the Deaf
- Sheboygan Public Schools
- Wisconsin School for the Deaf

WYOMING
- Wyoming School for the Deaf

REPORTS FROM THE ANNUAL SURVEY OF HEARING IMPAIRED CHILDREN AND YOUTH

SERIES D

No. 1 Academic Achievement Test Performance of Hearing Impaired Students — United States: Spring 1969

No. 2 Item Analysis of Academic Achievement Tests Hearing Impaired Students — United States: Spring 1969

No. 3 Additional Handicapping Conditions, Age at Onset of Hearing Loss, and Other Characteristics of Hearing Impaired Students — United States: 1968-69

No. 4 Type and Size of Educational Programs Attended By Hearing Impaired Students — United States: 1968-69

No. 5 Summary of Selected Characteristics of Hearing Impaired Students — United States: 1969-70

No. 6 Audiological Examinations of Hearing Impaired Students — United States: 1969-70

No. 7 Characteristics of Hearing Impaired Students Under Six Years of Age — United States: 1969-70

No. 8 Item Analysis of an Achievement Testing Program for Hearing Impaired Students — United States: Spring 1971

No. 9 Academic Achievement Test Results of a National Testing Program for Hearing Impaired Students — United States: Spring 1971

No. 10 Characteristics of Hearing Impaired Students by Hearing Status — United States: 1970-71

No. 11 Studies in Achievement Testing of Hearing Impaired Students—United States: Spring 1971

No. 12 Reported Causes of Hearing Loss for Hearing Impaired Students—United States: 1970-71

SPECIAL REPORTS FROM THE OFFICE OF DEMOGRAPHIC STUDIES, GALLAUDET COLLEGE

SERIES C

No. 1 National Survey of State Identification Audiometry Programs and Special Educational Services for Hearing Impaired Children and Youth — United States: 1972